CB-7000 DIO
User's Manual

CB-7041/7041D

CB-7042/7042D

CB-7043/7043D

CB-7044/7044D

CB-7050/7050D

CB-7052/7052D

CB-7053/7053D

CB-7060/7060D

CB-7063/7063D/A/AD/B/BD

CB-7065/7065D/A/AD/B/BD

CB-7066/7066D

CB-7067/7067D

Measurement Computing Corp.

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CB COM Digital.p65

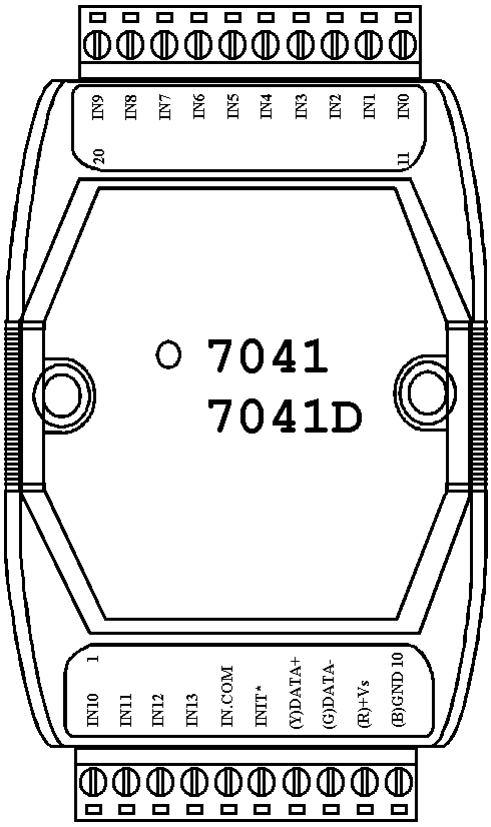
1. Introduction

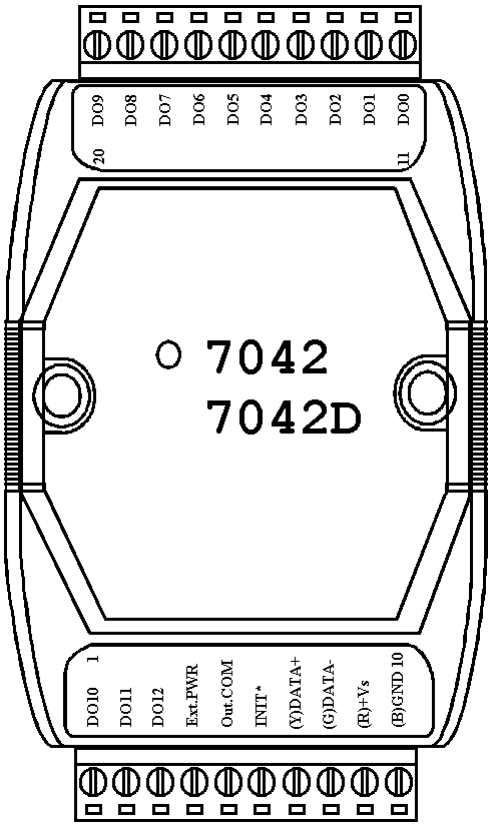
CB-7000 is a family of network data acquisition and control modules. They provide analog-to-digital, digital-to-analog, digital input/output, timer/counters and other functions. These modules can be remotely controlled by a set of commands. The DIO modules support TTL signals, photo-isolated digital inputs, relay contact outputs, solid-state relay outputs, PhotoMOS outputs, and open-collector outputs. Refer to *Sec. 1.3* for detailed information.

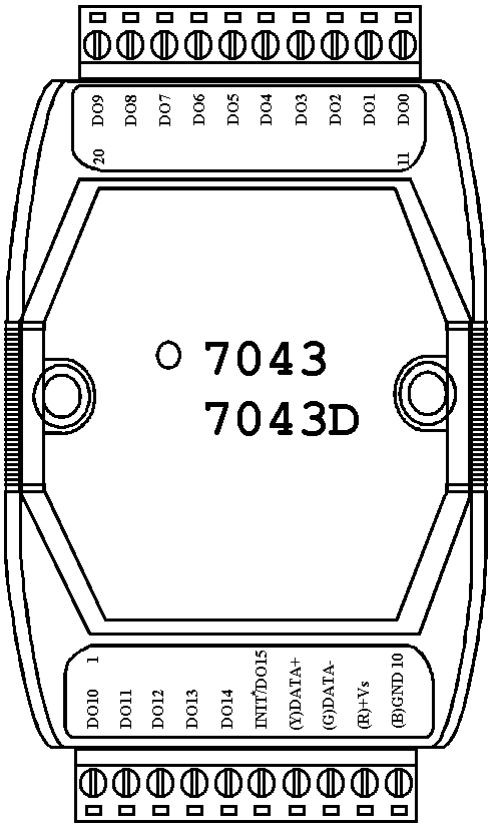
1.1 More Information

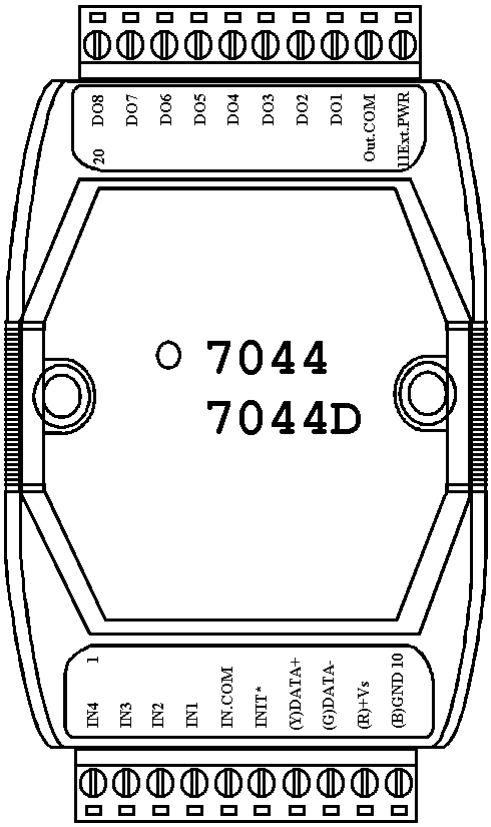
1.1 CB-7000 Overview
1.2 CB-7000 Pin Assignments
1.3 CB-7000 Specifications
1.4 CB-7000 Block Diagrams
1.5 CB-7000 Connections

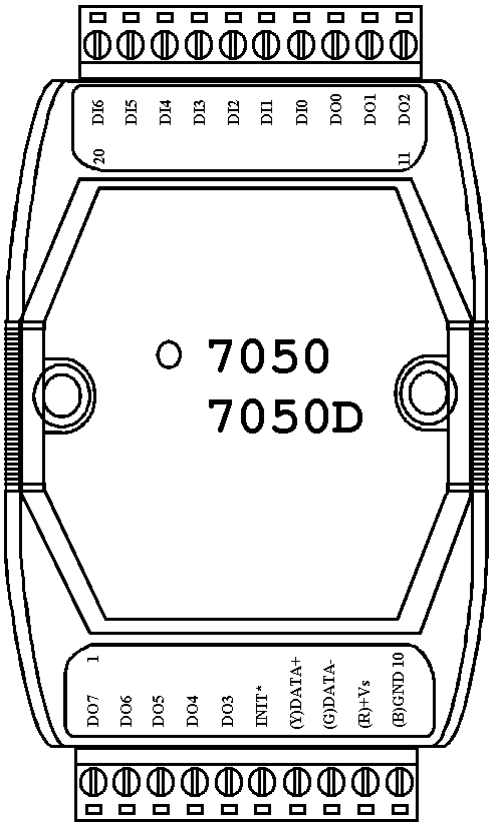
1.2 Pin Assignments

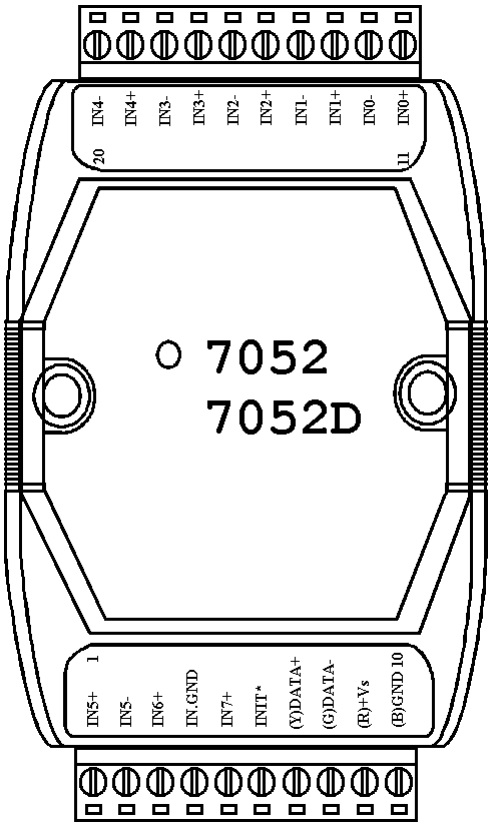


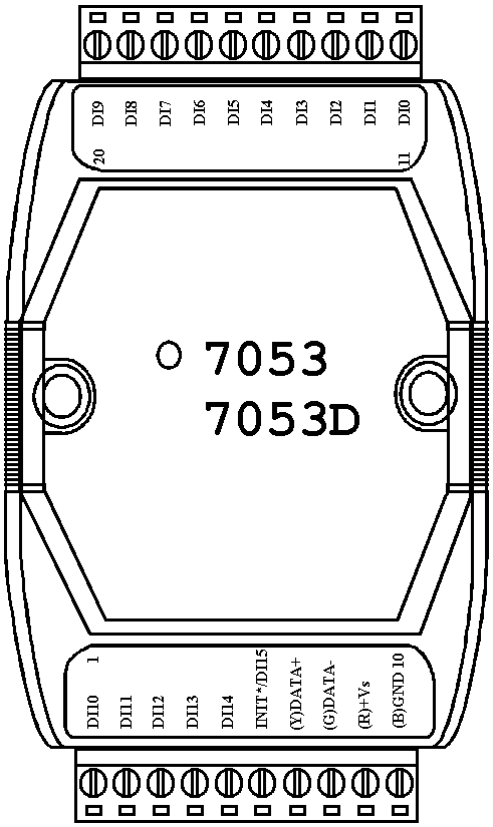


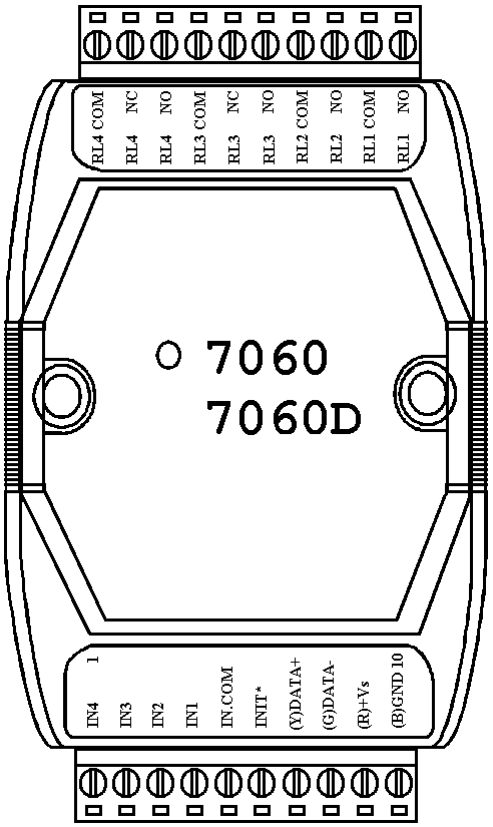


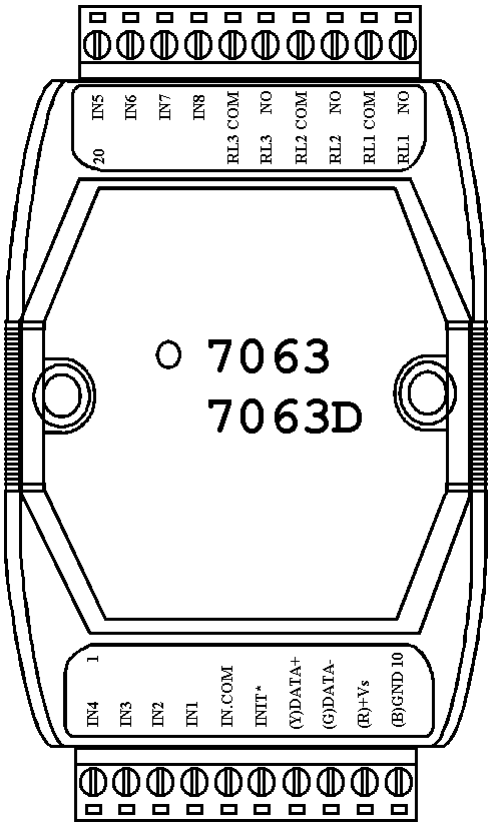


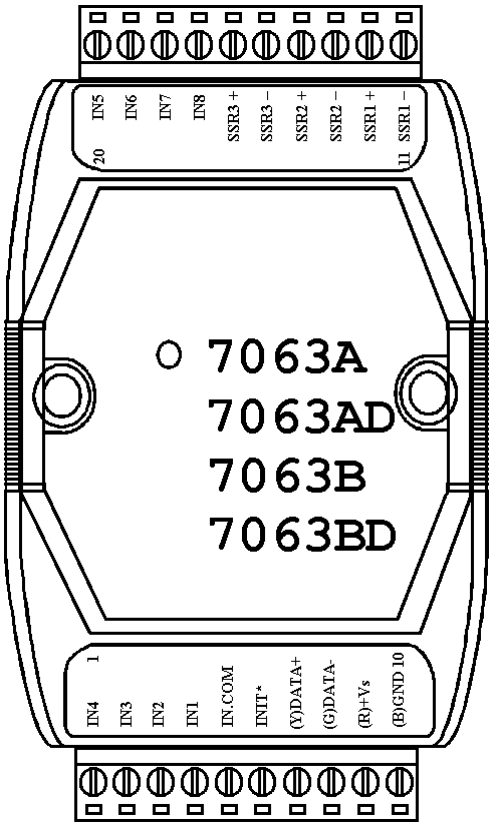

7050
7050D
20 DI6 DI5 DI4 DI3 DI2 DI1 DI0 DO0 DO1 DO2 11
DO7 DO6 DO5 DO4 DO3 INIT* (Y)DATA+ (G)DATA- (R)+Vs (B)GND
1 10

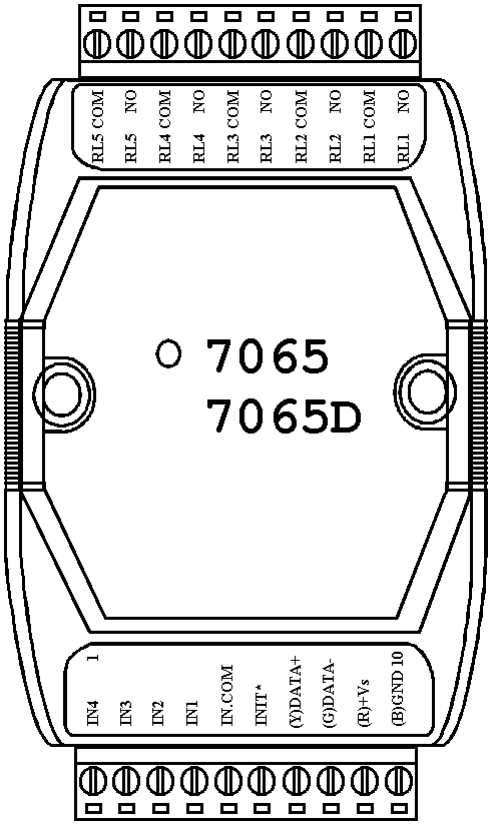

7052
7052D
20 IN4- IN4+ IN3- IN3+ IN2- IN2+ IN1- IN1+ IN0- IN0+ 11
IN5+ IN5- IN6+ IN.GND IN7+ INIT* (Y)DATA+ (G)DATA- (R)+Vs (B)GND
1 10

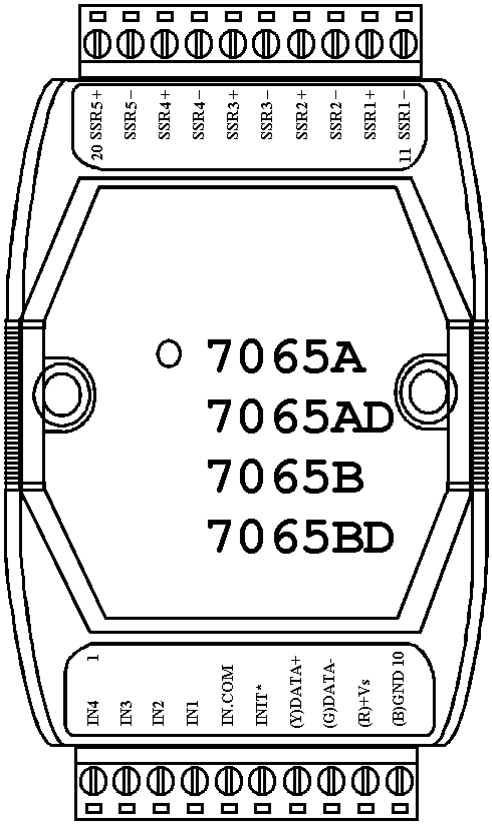

7053
7053D
20 DI9 DI8 DI7 DI6 DI5 DI4 DI3 DI2 DI1 DI0 11
DI10 DI11 DI12 DI13 DI14 INIT*/DI15 (Y)DATA+ (G)DATA- (R)+Vs (B)GND
1 10

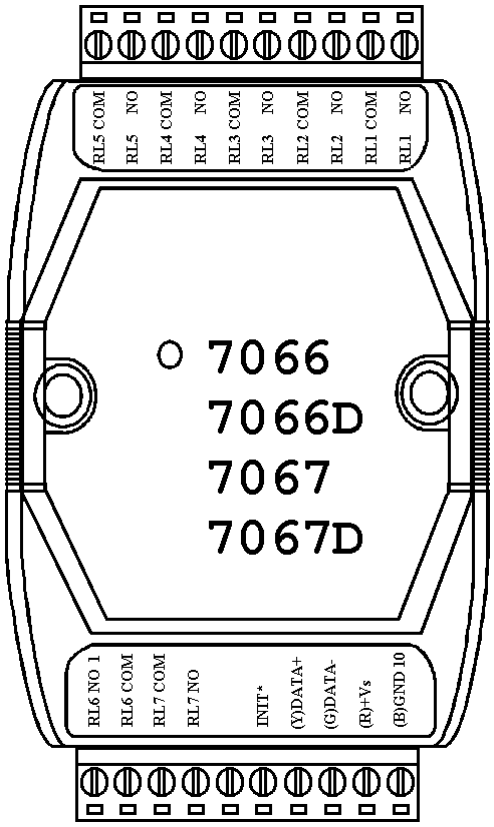

7060
7060D
RL4 COM RL4 NC RL4 NO RL3 COM RL3 NC RL3 NO RL2 COM RL2 NO RL1 COM RL1 NO
IN4 IN3 IN2 IN1 IN.COM INIT* (Y)DATA+ (G)DATA- (R)+Vs (B)GND
1 10


7063
7063D
20 IN5 IN6 IN7 IN8 RL3 COM RL3 NO RL2 COM RL2 NO RL1 COM RL1 NO
1 IN4 IN3 IN2 IN1 IN.COM INIT* (Y)DATA+ (G)DATA- (R)+Vs (B)GND 10


7063A
7063AD
7063B
7063BD
20 IN5 IN6 IN7 IN8 SSR3 + SSR3 – SSR2 + SSR2 – SSR1 + SSR1 – 11
1 IN4 IN3 IN2 IN1 IN.COM INIT* (Y)DATA+ (G)DATA- (R)+Vs (B)GND 10


7065
7065D
RL5 COM RL5 NO RL4 COM RL4 NO RL3 COM RL3 NO RL2 COM RL2 NO RL1 COM RL1 NO
1 IN4 IN3 IN2 IN1 IN.COM INIT* (Y)DATA+ (G)DATA- (R)+Vs (B)GND 10


7065A
7065AD
7065B
7065BD
20 SSR5 + SSR5 – SSR4 + SSR4 – SSR3 + SSR3 – SSR2 + SSR2 – SSR1 + SSR1 – 11
1 IN4 IN3 IN2 IN1 IN.COM INIT* (Y)DATA+ (G)DATA- (R)+Vs (B)GND 10


RL5 COM
RL5 NO
RL4 COM
RL4 NO
RL3 COM
RL3 NO
RL2 COM
RL2 NO
RL1 COM
RL1 NO
7066
7066D
7067
7067D
RL6 NO 1
RL6 COM
RL7 COM
RL7 NO
INIT*
(Y)DATA+
(G)DATA-
(R)+Vs
(B)GND 10

1.3 Specifications

Digital Input Modules			
	I-7041/41D	I-7052/52D	I-7053/53D
Input Channels	14	8	16
Isolation	Isolation with Common Source	6 differential and 2 common ground	Non-Isolated
Isolation Voltage	3750 Vrms	5000 Vrms	Non-Isolated
Digital Level 0	+1V max	+1V max	+2V max
Digital Level 1	+4 to +30 V	+4 to +30 V	+4 to +30 V
Input Impedance	3K ohms	3K ohms	820 ohms
Power Input	+10 to +30 VDC		
Power Consumption	0.2W(I-7041) 0.9W(I-7041D)	0.2W(I-7052) 0.6W(I-7052D)	0.7W(I-7053) 0.9W(I-7053D)

PhotoMOS Output Module	
	I-7066/66D
Output Channels	7
Load Current	0.13A
Load Voltage	350V max
Isolation Voltage	5000VAC
TurnOn Time	0.7mS typ
TurnOff Time	0.05mS typ
Power Input	+10 to +30 VDC
Power Consumption	0.5W(I-7066) 0.8W(I-7066D)

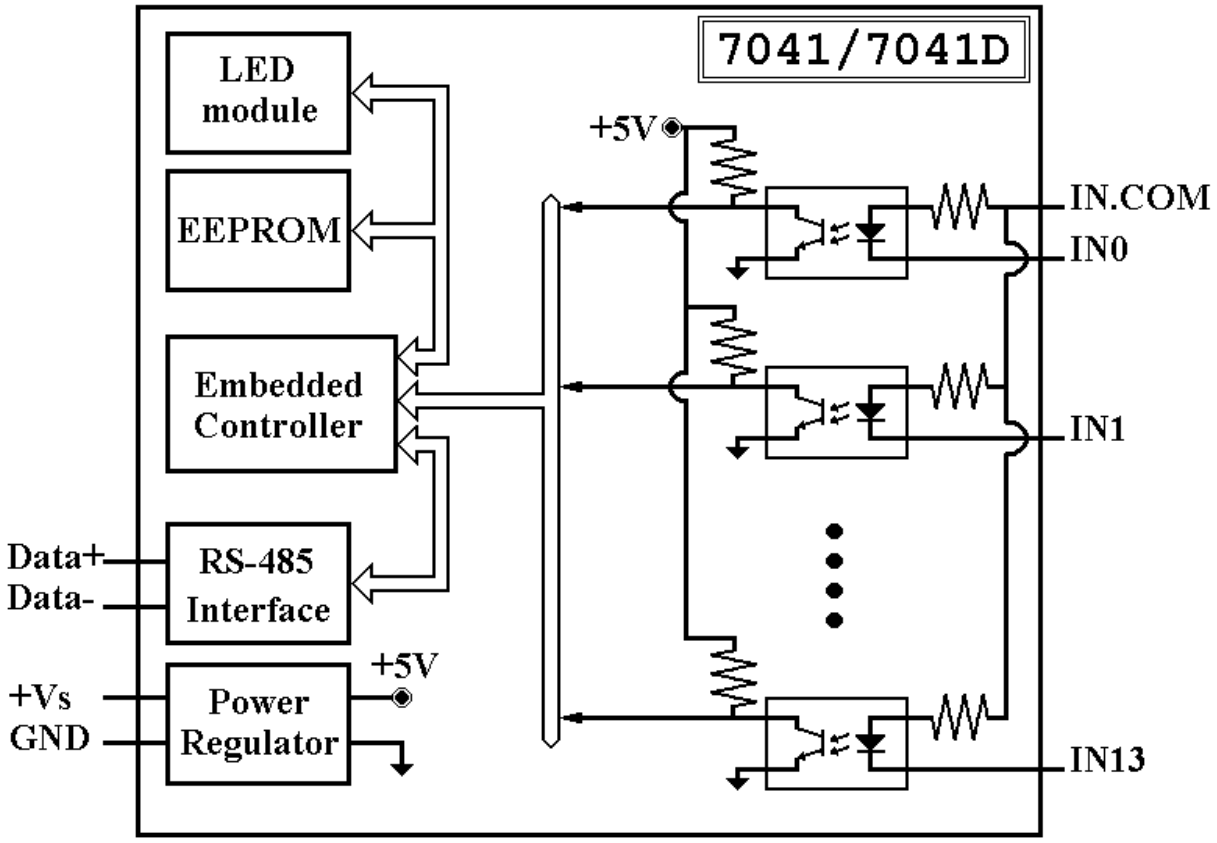
Open Collector Output Modules				
	I-7042 I-7042D	I-7043 I-7043D	I-7044 I-7044D	I-7050 I-7050D
Output Channels	13	16	8	8
Isolation	Isolation with Common Power	Non-Isola-tion	Isolation with Common Power	Non-Isola-tion
Isolation Voltage	3750 Vrms		3750 Vrms	
Load Voltage	Max +30V			
Max Load Current	100mA		375mA	30mA
Input Channels	No-Inputs		4	7
Isolation			Isolation with Common Source	Non-Isola-tion
Isolation Voltage			3750 Vrms	
Digital Level 0			1V max	1V max
Digital Level 1			4 to 30V	3.5 to 30V
Input Impedance			3K ohms	
Power Input	+10 to +30 VDC			
Power Consumption	1.0W (I-7042) 1.7W (I-7042D)	0.4W (I-7043) 1.1W (I-7043D)	1.0W (I-7044) 1.7W (I-7044D)	0.4W (I-7050) 1.1W (I-7050D)

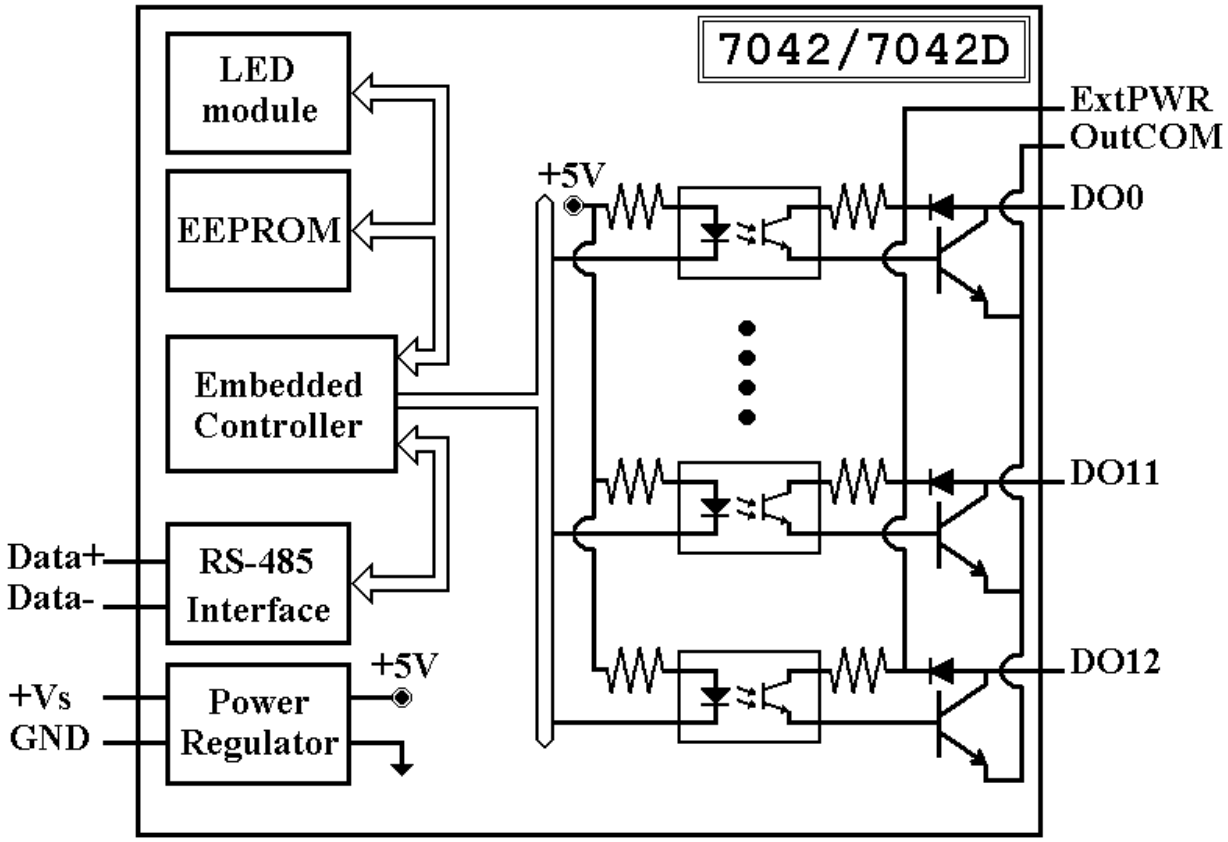
Relay Output Modules				
	I-7060 I-7060D	I-7063 I-7063D	I-7065 I-7065D	I-7067 I-7067D
Output Channels	4	3	5	7
Relay Type	RL1, RL2 : Form A RL3, RL4 : Form C	Form A	Form A	Form A
Contact Rating	0.6A @125VAC 2A @30VDC	5A@250VAC 5A@30VDC		0.5A @120VAC 1.0A @24VDC
Surge Strength	500V	4000V		1500V
Operate Time	3mS	6mS Max.		5mS Max.
Release Time	2mS	3mS Max.		2mS Max.
Min. Life	$5*10^5$ ops.	10^5 ops.		10^5 ops.
Input Channels	4	8	4	No input
Isolation	Isolation with Common Source			
Isolation Voltage	3750Vrms			
Digital Level 0	+1V max			
Digital Level 1	+4 to +30 V			
Input Impedance	3K ohms			
Power Input	+10 to +30 VDC			
Power Consumption	1.3W (I-7060) 1.9W (I-7060D)	1.0W (I-7063) 1.5W (I-7063D)	1.3W (I-7065) 2.2W (I-7065D)	1.5W (I-7067) 2.2W (I-7067D)

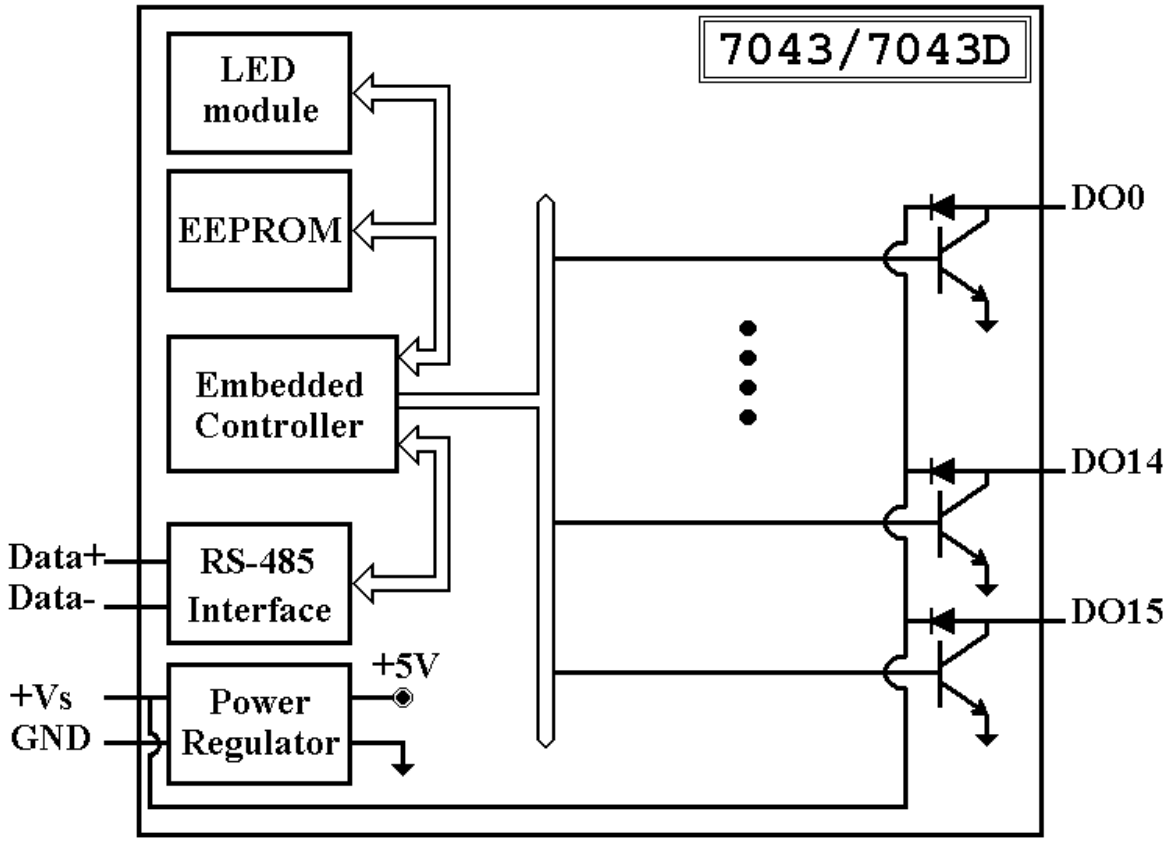
Solid-State Relay Output Modules				
	I-7063A I-7063AD	I-7065A I-7065AD	I-7063B I-7063BD	I-7065B I-7065BD
Output Channels	3	5	3	5
SSR Type	AC-SSR, Normal Open		DC-SSR, Normal Open	
Load Voltage Range	24 to 265 Vrms		3 to 30 VDC	
Leakage Current	1.5 mArms		0.1 mA	
Max Load Current	1.0 Arms		1.0 A	
Min. Operate Time	1mS			
Min. Release Time	1/2 cycle + 1mS		1mS	
Dielectric Strength	2500 Vrms			
Input Channels	8	4	8	4
Isolation	Isolation with Common Source			
Isolation Voltage	3750Vrms			
Digital Level 0	+1V max			
Digital Level 1	+4 to +30 V			
Input Impedance	3K ohms			
Power Input	+10 to +30 VDC			
Power Consumption	0.7W (I-7063A) 1.5W (I-7063AD)	0.8W (I-7065A) 1.6W (I-7065AD)	0.6W (I-7063B) 1.4W (I-7063BD)	0.7W (I-7065B) 1.5W (I-7065BD)

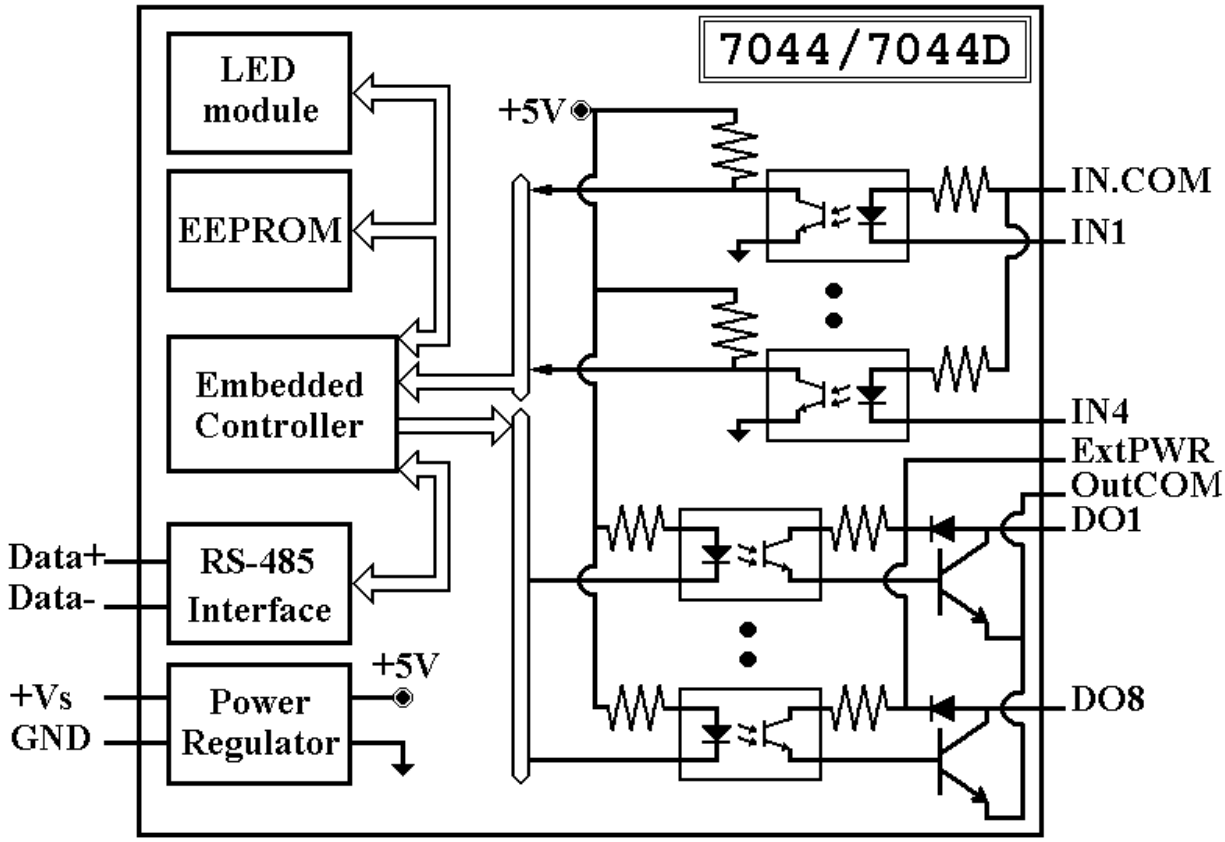
Note: Model numbers "I-nnnn" and model numbers "CB-nnnn" are identical.

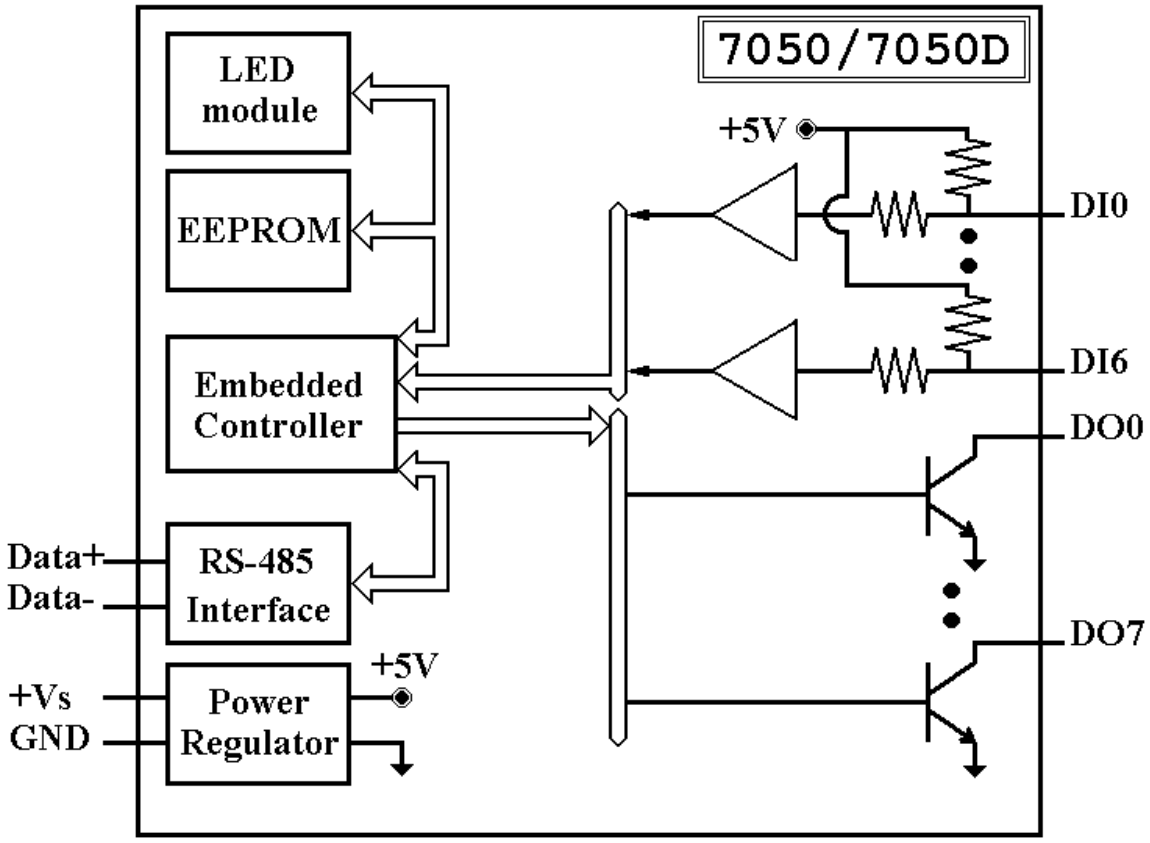
1.4 Block Diagrams

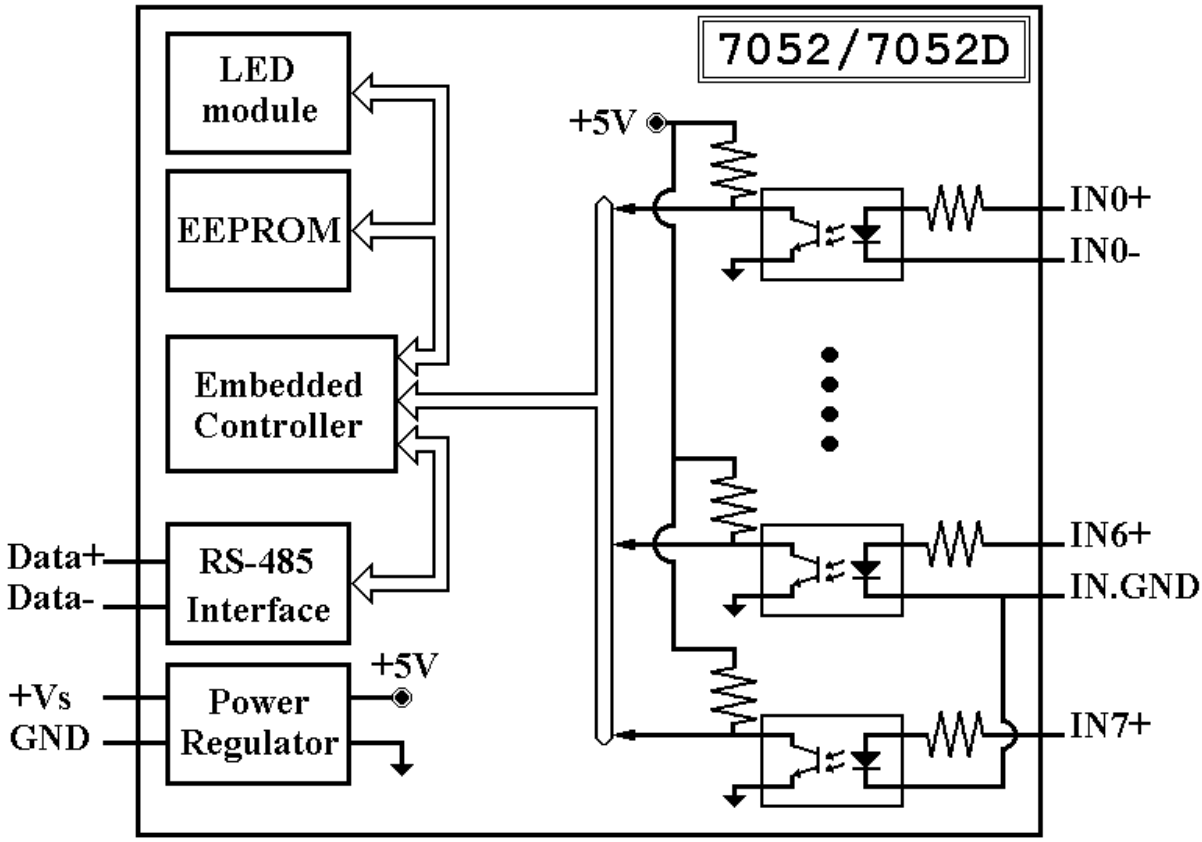


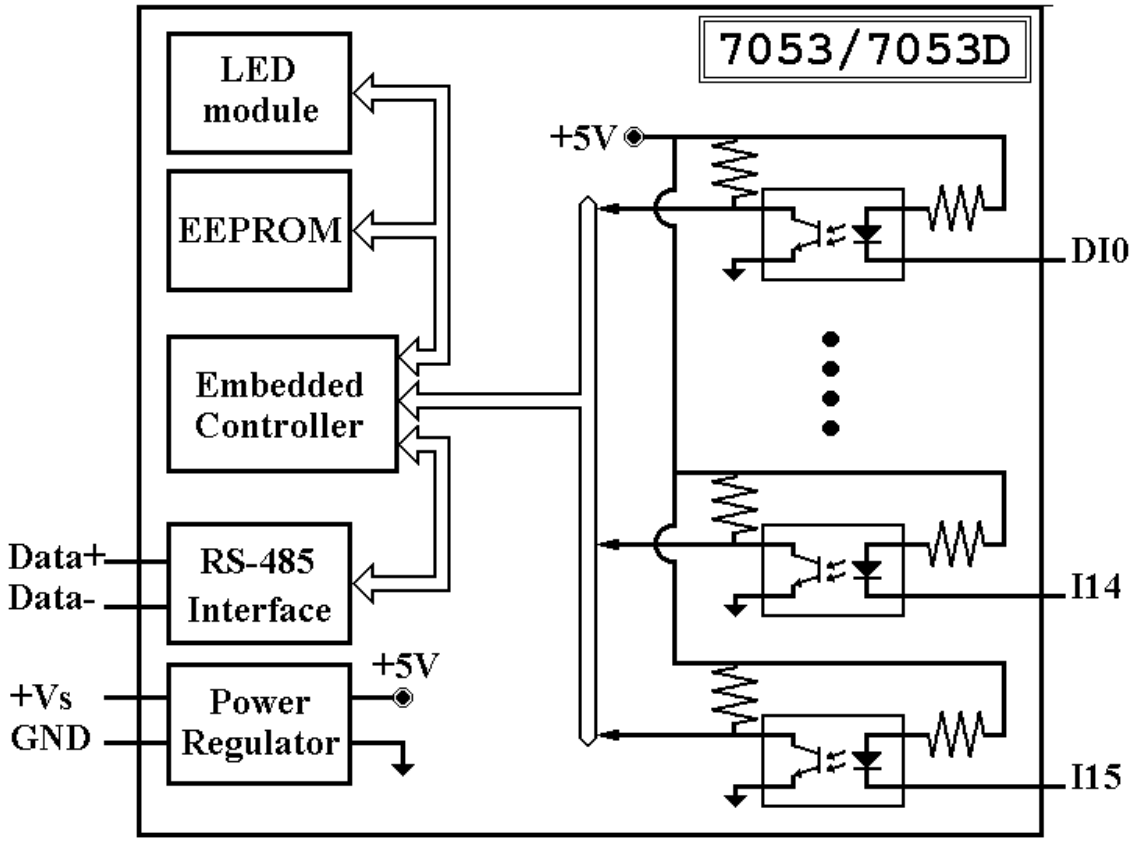


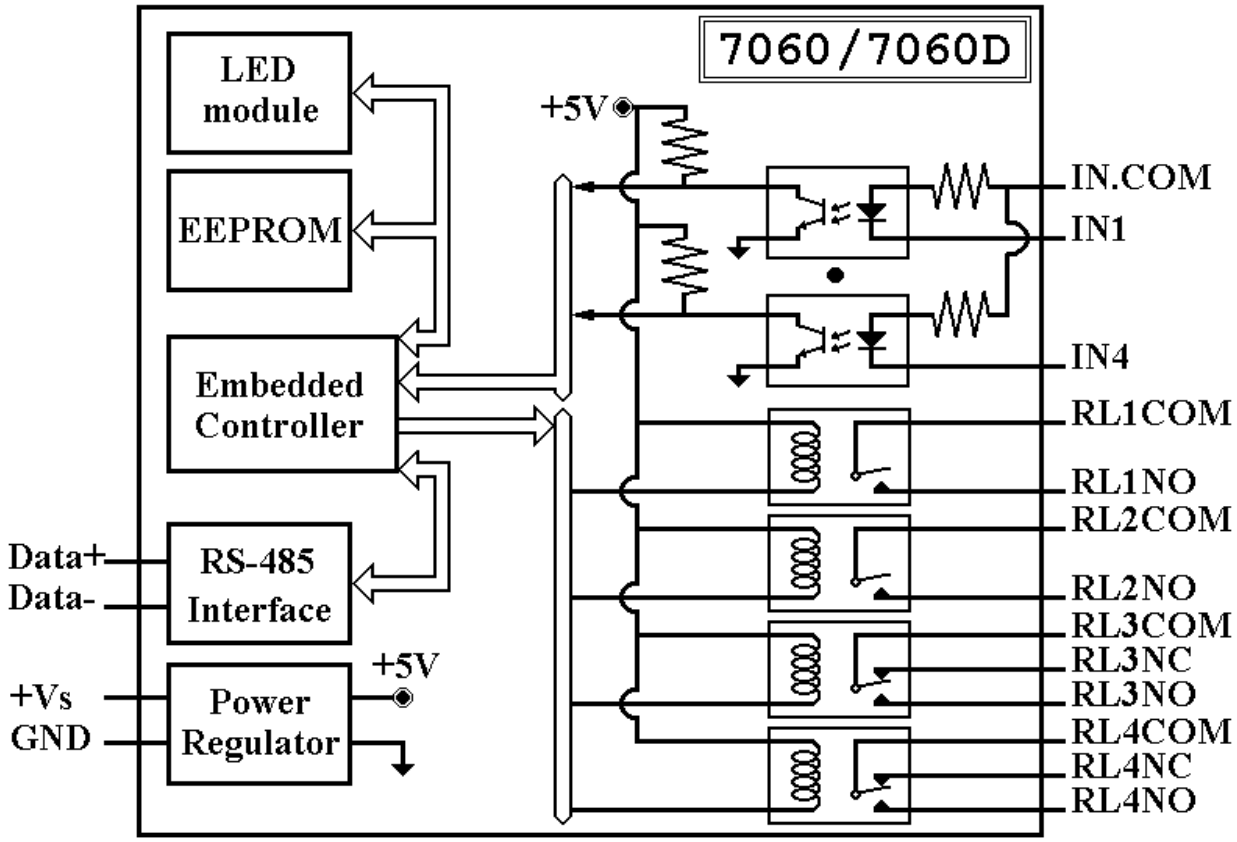

7043/7043D
LED module
EEPROM
Embedded Controller
RS-485 Interface
Power Regulator
Data+
Data-
+Vs
GND
+5V
DO0
DO14
DO15

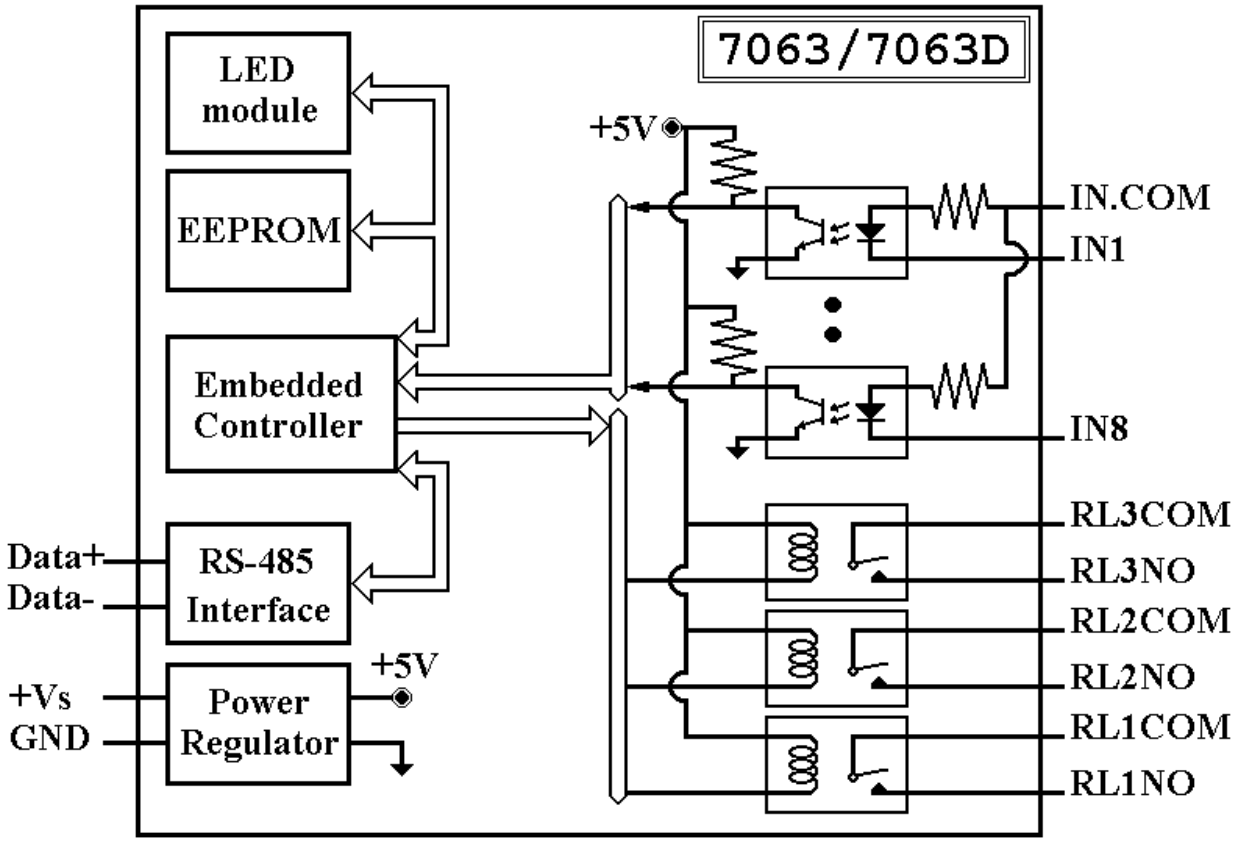

7044/7044D
LED module
EEPROM
Embedded Controller
RS-485 Interface
Power Regulator
Data+
Data-
+Vs
GND
+5V
+5V
IN.COM
IN1
IN4
ExtPWR
OutCOM
DO1
DO8

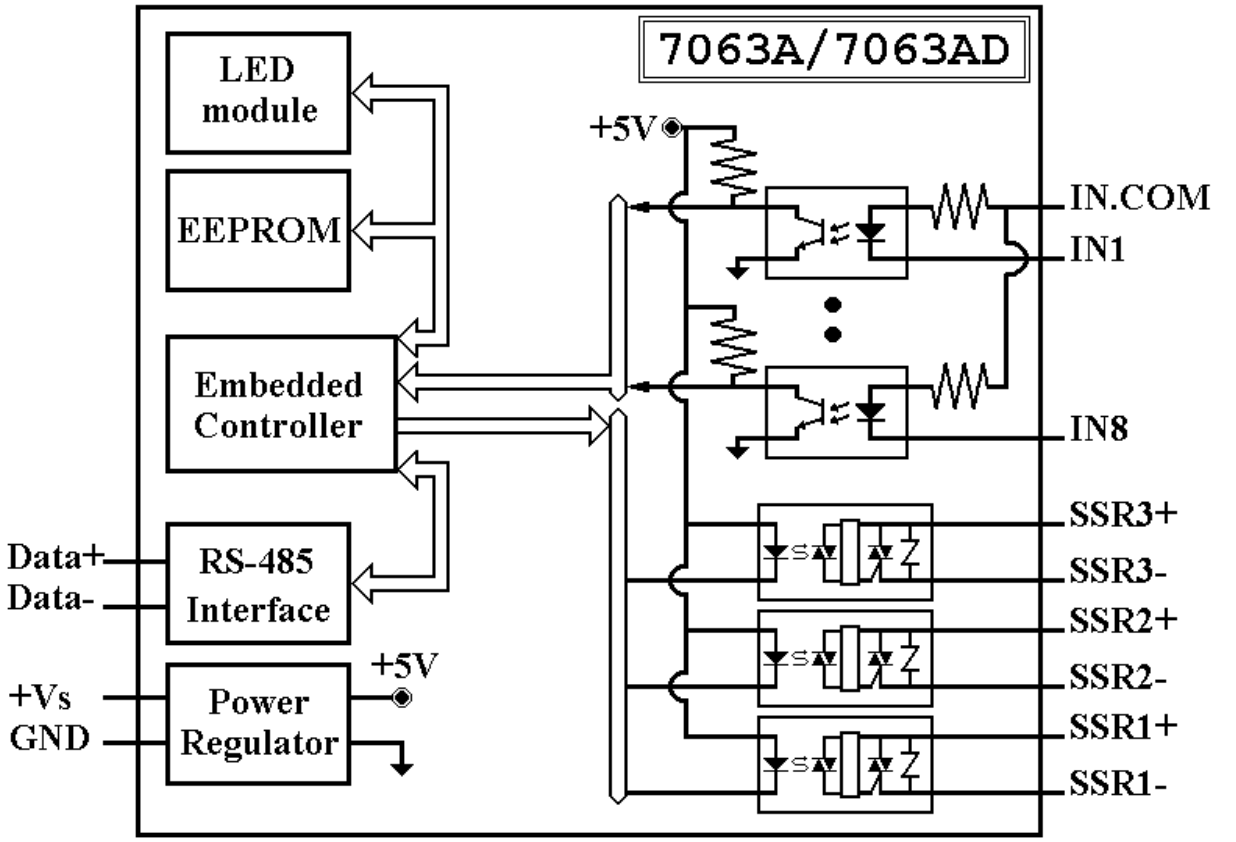

7050/7050D
LED module
EEPROM
Embedded Controller
RS-485 Interface
Power Regulator
+5V
+Vs
GND
Data+
Data-
+5V
DI0
DI6
DO0
DO7

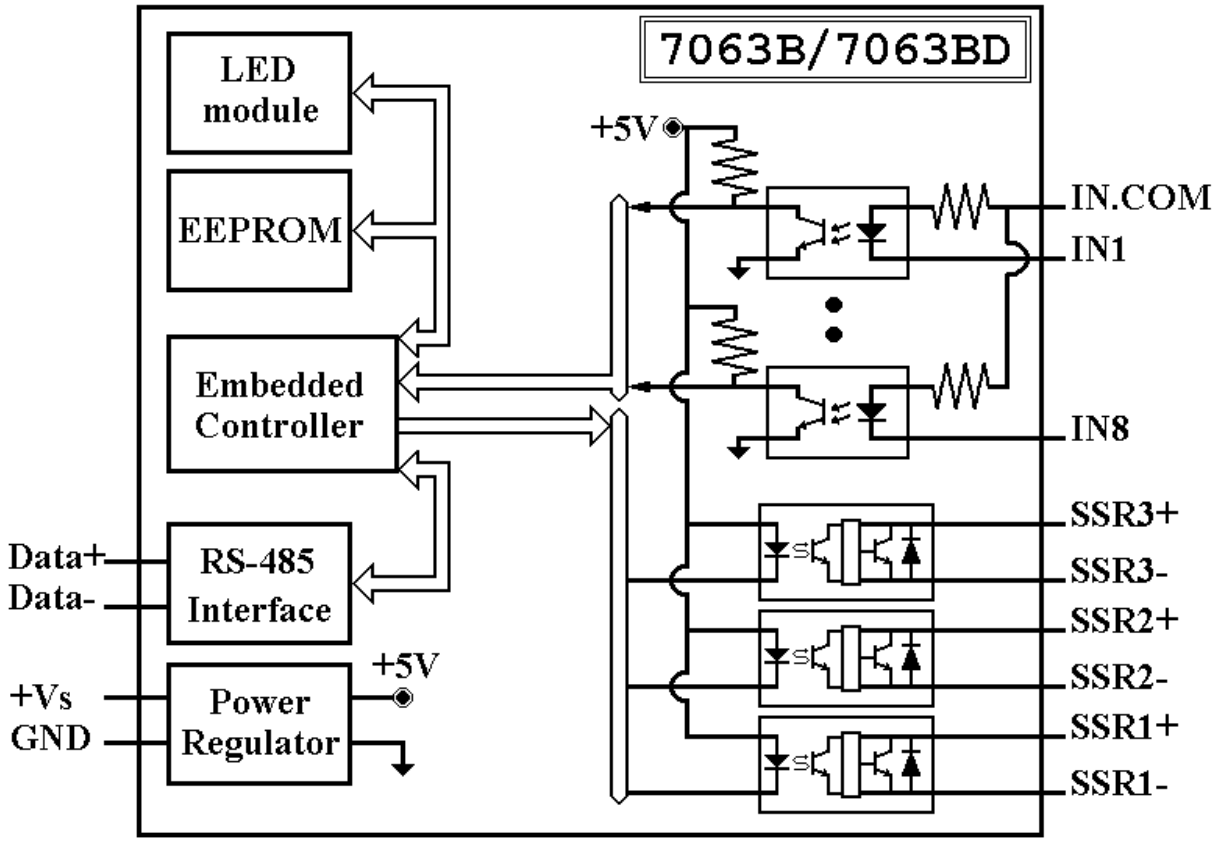

7052/7052D
LED module
EEPROM
Embedded Controller
RS-485 Interface
Power Regulator
+5V
+Vs
GND
Data+
Data-
+5V
IN0+
IN0-
IN6+
IN.GND
IN7+

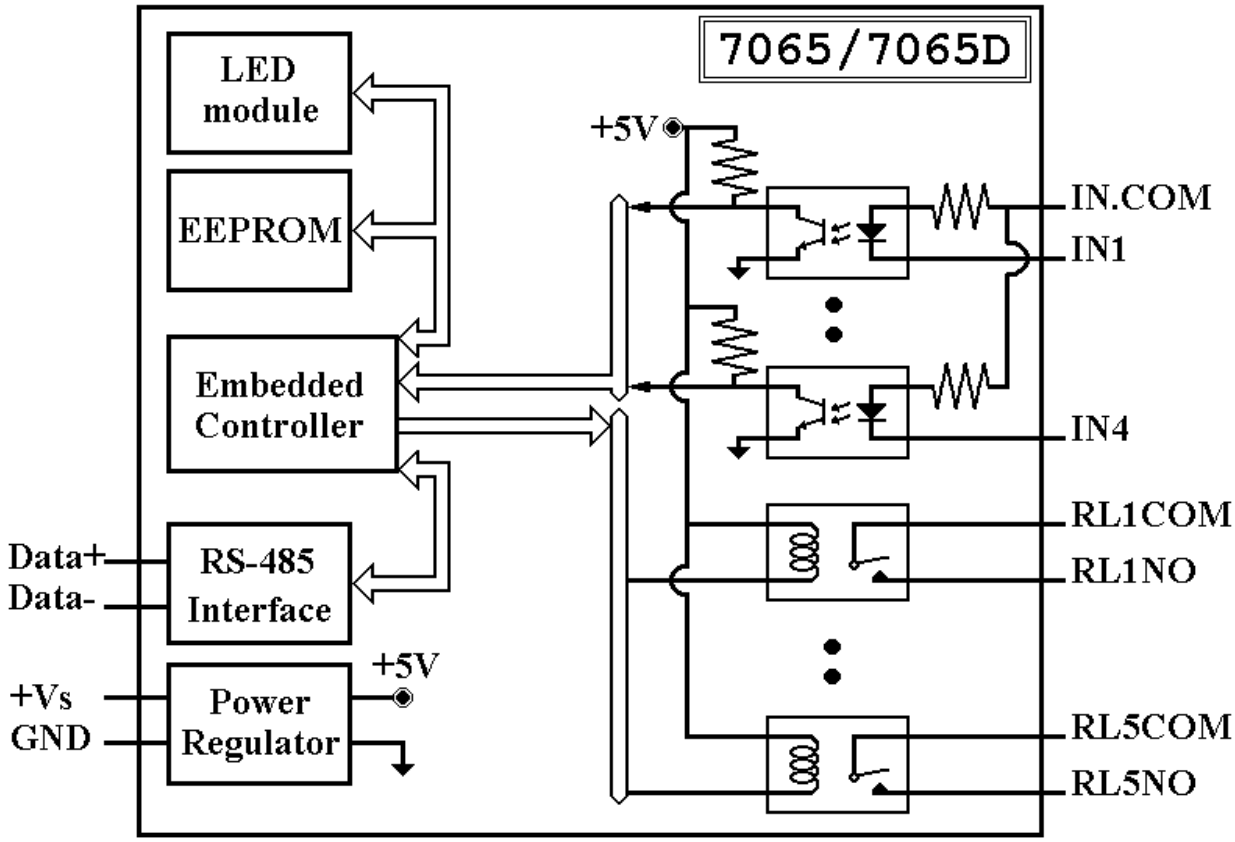

7053/7053D
LED module
EEPROM
Embedded Controller
RS-485 Interface
Power Regulator
Data+
Data-
+Vs
GND
+5V
+5V
DI0
I14
I15

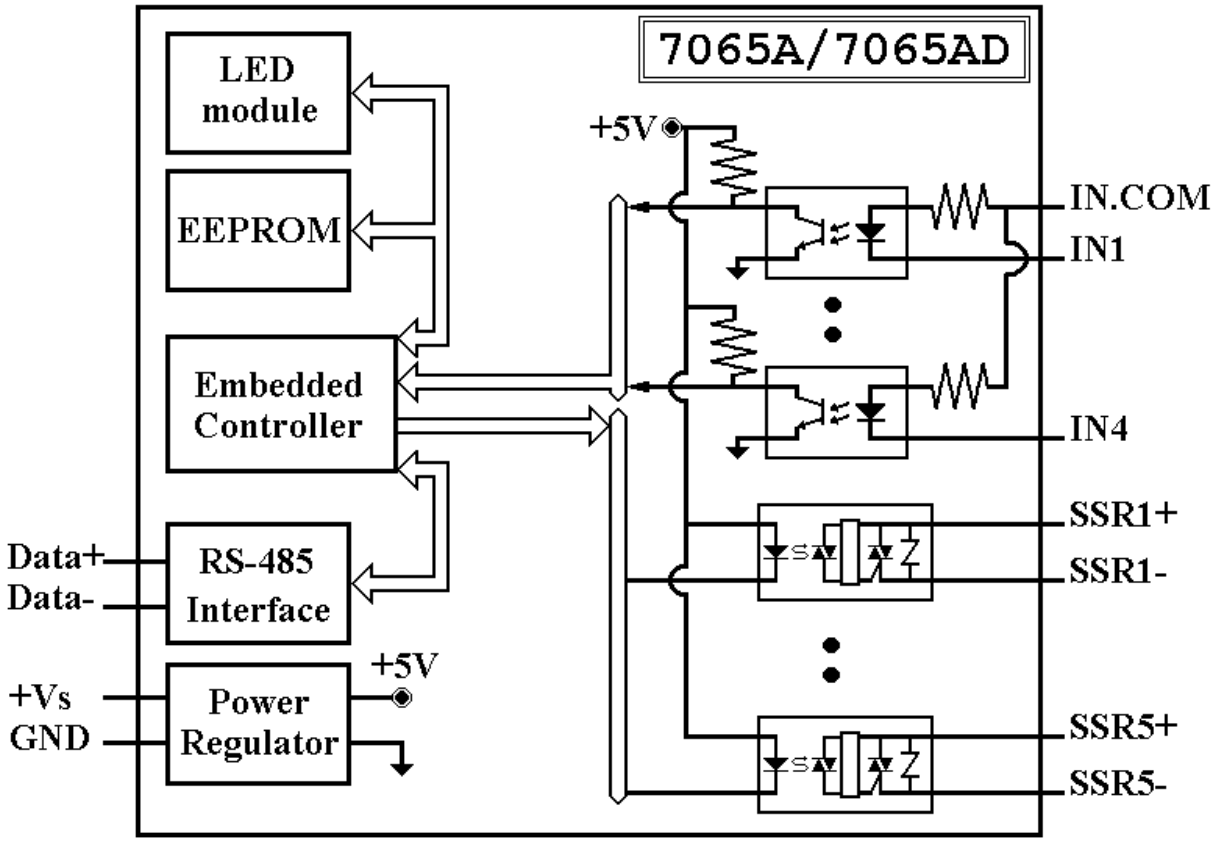

7060/7060D
LED module
EEPROM
Embedded Controller
RS-485 Interface
Power Regulator
Data+
Data-
+Vs
GND
+5V
+5V
IN.COM
IN1
IN4
RL1COM
RL1NO
RL2COM
RL2NO
RL3COM
RL3NC
RL3NO
RL4COM
RL4NC
RL4NO

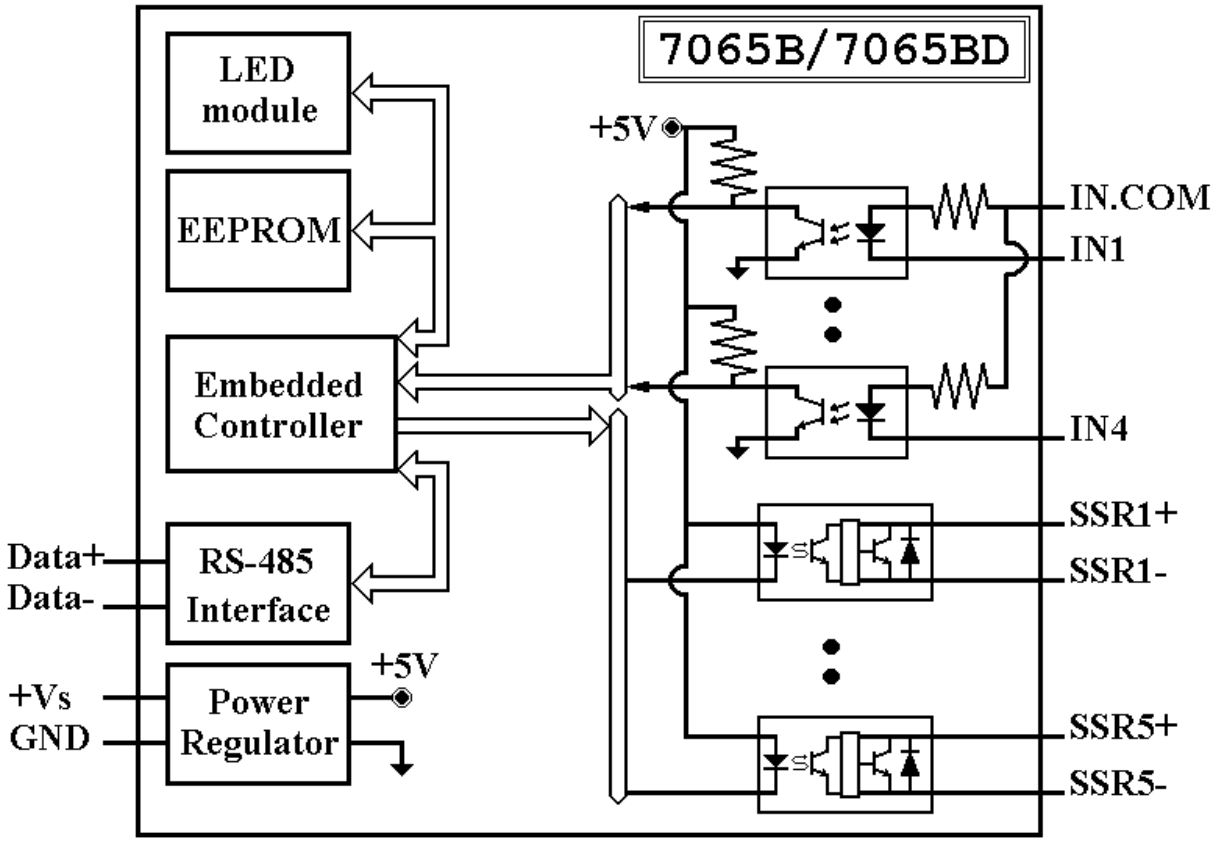

7063/7063D
LED module
EEPROM
Embedded Controller
RS-485 Interface
Power Regulator
+5V
Data+
Data-
+Vs
GND
+5V
IN.COM
IN1
IN8
RL3COM
RL3NO
RL2COM
RL2NO
RL1COM
RL1NO

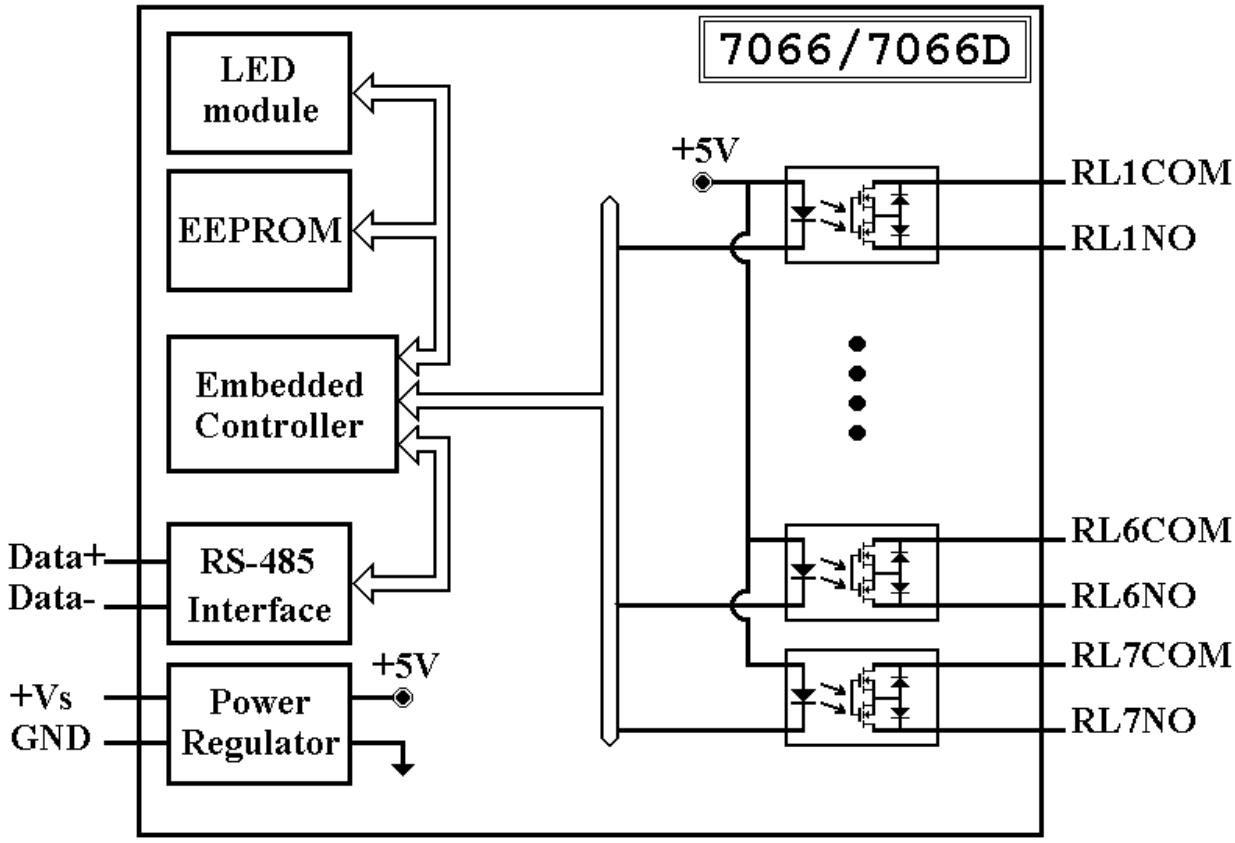

7063A/7063AD
LED module
EEPROM
Embedded Controller
RS-485 Interface
Power Regulator
+5V
Data+
Data-
+Vs
GND
+5V
IN.COM
IN1
IN8
SSR3+
SSR3-
SSR2+
SSR2-
SSR1+
SSR1-

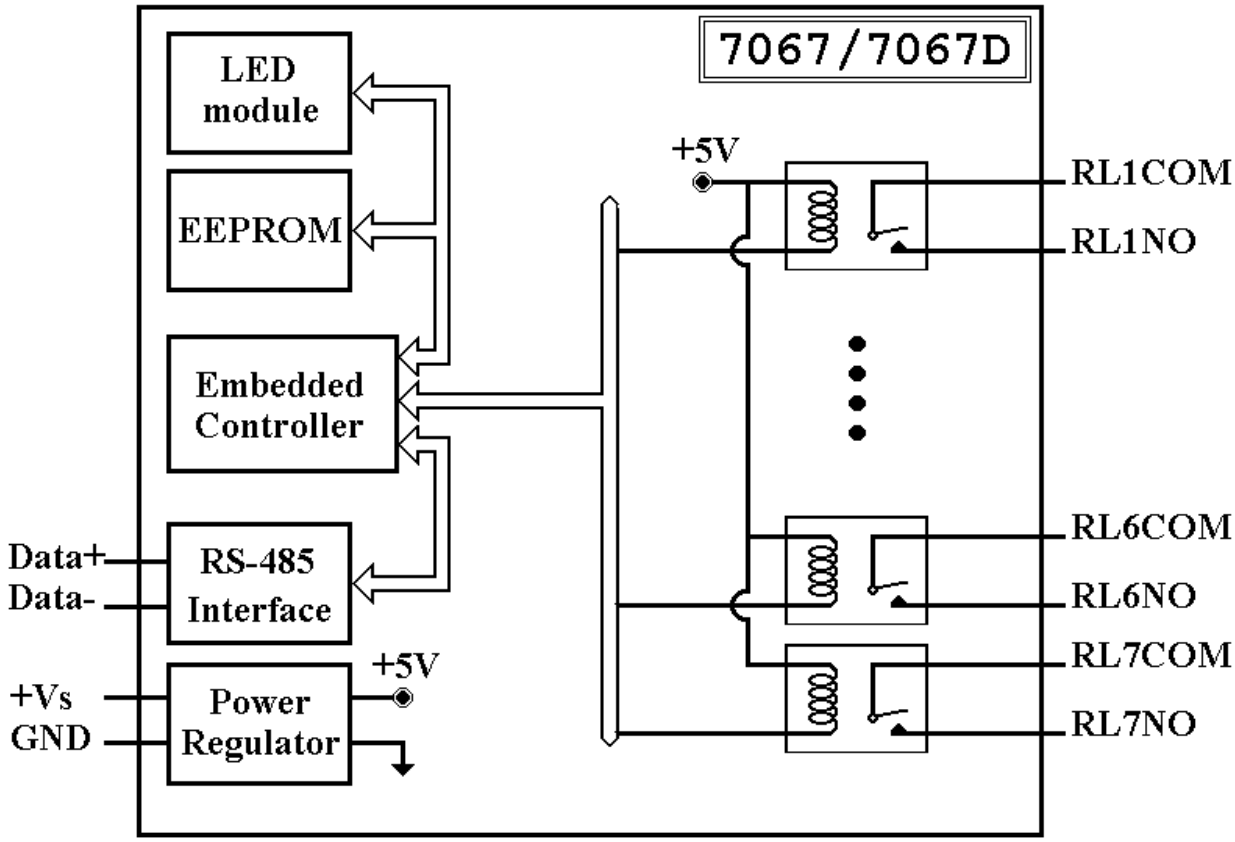

7063B/7063BD
LED module
EEPROM
Embedded Controller
RS-485 Interface
Power Regulator
Data+
Data-
+Vs
GND
+5V
+5V
IN.COM
IN1
IN8
SSR3+
SSR3-
SSR2+
SSR2-
SSR1+
SSR1-


7065/7065D
LED module
EEPROM
Embedded Controller
RS-485 Interface
Power Regulator
Data+
Data-
+Vs
GND
+5V
+5V
IN.COM
IN1
IN4
RL1COM
RL1NO
RL5COM
RL5NO


7065A/7065AD
LED module
EEPROM
Embedded Controller
RS-485 Interface
Power Regulator
+5V
Data+
Data-
+Vs
GND
+5V
IN.COM
IN1
IN4
SSR1+
SSR1-
SSR5+
SSR5-


7065B/7065BD
LED module
EEPROM
Embedded Controller
RS-485 Interface
Power Regulator
+5V
Data+
Data-
+Vs
GND
+5V
IN.COM
IN1
IN4
SSR1+
SSR1-
SSR5+
SSR5-

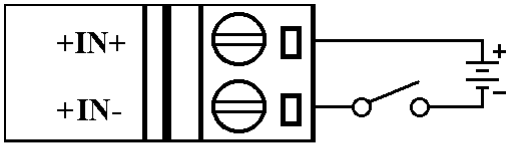

7066/7066D
LED module
EEPROM
Embedded Controller
RS-485 Interface
Power Regulator
Data+
Data-
+Vs
GND
+5V
+5V
RL1COM
RL1NO
RL6COM
RL6NO
RL7COM
RL7NO

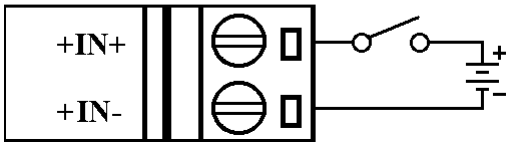

7067/7067D
LED module
EEPROM
Embedded Controller
RS-485 Interface
Power Regulator
Data+
Data-
+Vs
GND
+5V
+5V
RL1COM
RL1NO
RL6COM
RL6NO
RL7COM
RL7NO

1.5 Connections

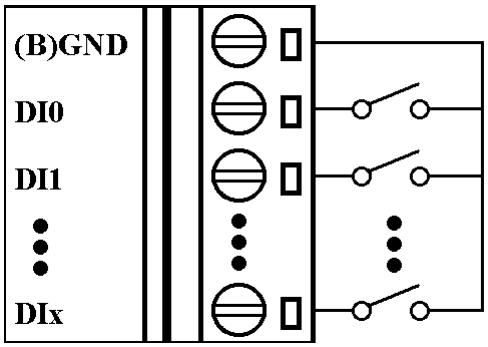
Dry Contact signal input

CB-7052/52D

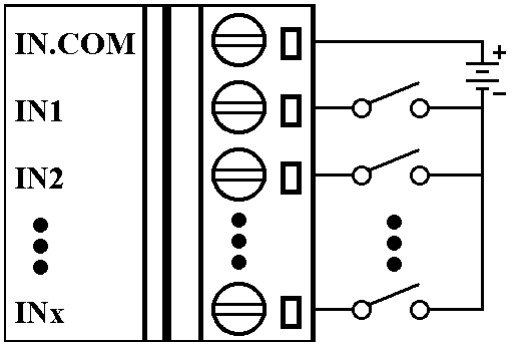




CB-7050/50D/53/53D

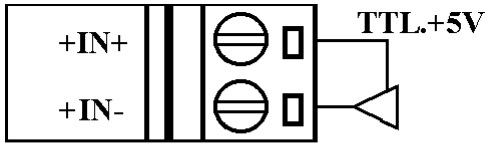


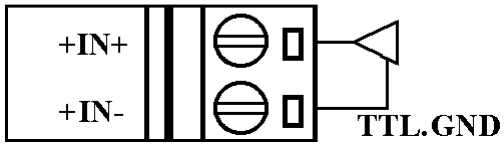
CB-7041/41D/44/44D/60/60D/
63/63D/63A/63AD/63B/63BD/
65/65D/65A/65AD/65B/65BD



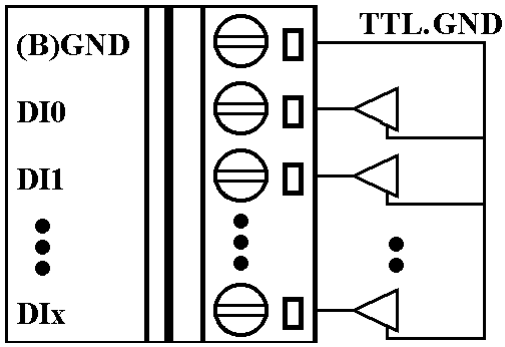
TTL/CMOS signal input

CB-7052/52D

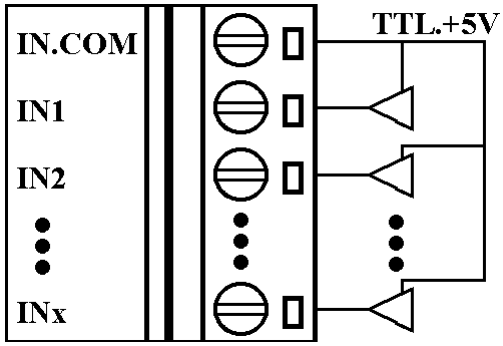




CB-7050/50D/53/53D

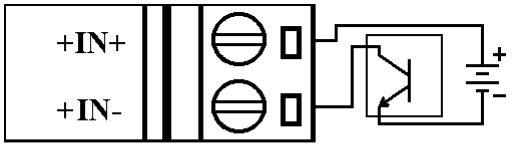


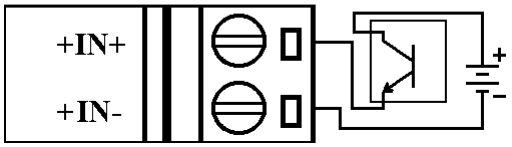
CB-7041/41D/44/44D/60/60D/
63/63D/63A/63AD/63B/63BD/
65/65D/65A/65AD/65B/65BD

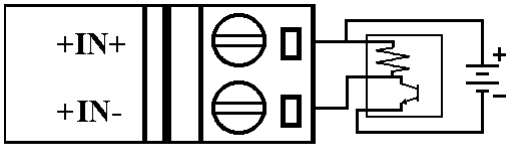


Open Collector signal input

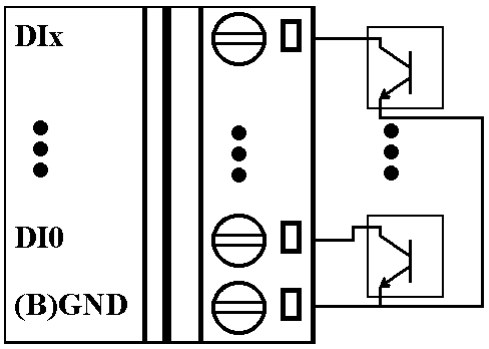
CB-7052/52D

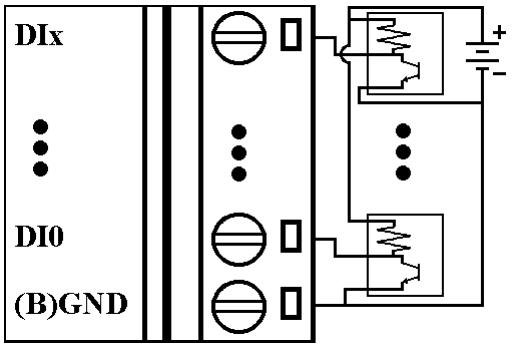




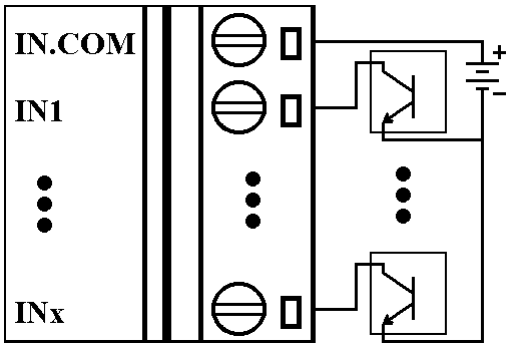


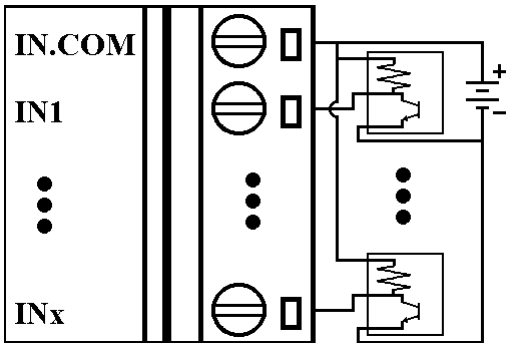
CB-7050/50D/53/53D





CB-7041/41D/44/44D/60/60D/
63/63D/63A/63AD/63B/63BD/
65/65D/65A/65AD/65B/65BD

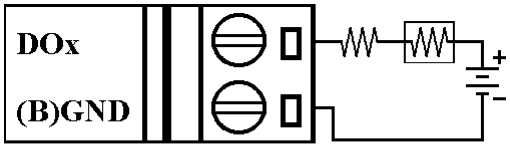


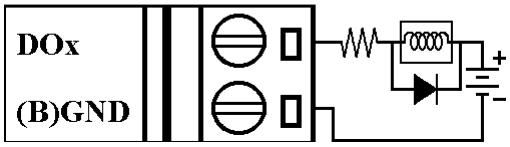


Open Collector output

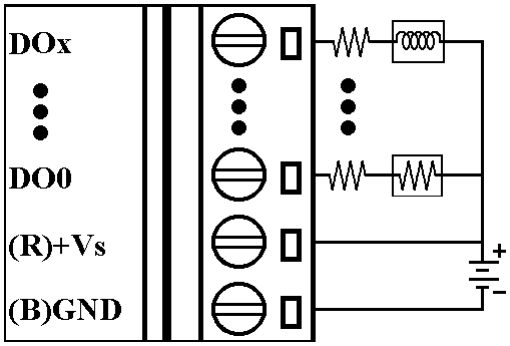
CB-7050/50D

Note: When connecting inductive loads (for example, a relay), install a diode to prevent counter EMF kickback.

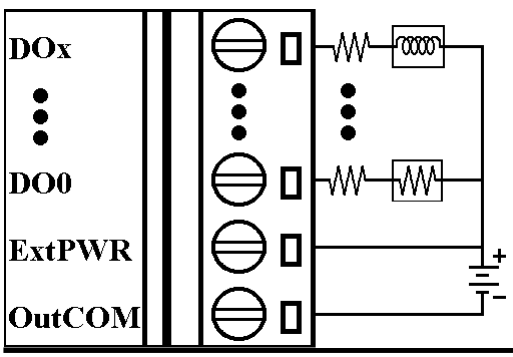




CB-7043/43D



CB-7042/42D/44/44D



1.6 Quick Start

Refer to "**CBCOM Series Network Setup and Quick Start Manual**" and "**Getting Started**" for details.

1.7 Default Setting

Default setting for CB-7000 DIO modules:

- Address: 01
- Baud rate: 9600 bps
- Type: Type 40 for DIO mode
- Checksum Disable
- CB-7043/43D jumper setting at INIT*
- CB-7053/53D jumper setting at INIT*

1.8 Jumper Setting

CB-7043/43D: Jumper J3 for select the pin INIT*/DO15

Select DO15

Select INIT*

(default)

CB-7053/53D: Jumper J1 for select the pin INIT*/DI15

Select DI15

Select INIT*

(default)

1.9 Configuration Tables

Configuration Table of CB-7000 DIO modules

Baud rate Setting (CC)

Code	03	04	05	06	07	08	09	0A
Baudrate	1200	2400	4800	9600	19200	38400	57600	115200

Type Setting (TT)

Type = **40** for DIO mode

Data Format Setting (FF)

7	6	5	4	3	2	1	0
*1	*2	0	0	0	*3		

*1: Counter Update Direction: 0=Falling Edge, 1=Rising Edge

*2: Checksum Bit: 0=Disable, 1=Enable

*3: 7050 = 0 (Bit[2.1.0] = 000), 7060 = 1 (Bit[2.1.0] = 001)
7052 = 2 (Bit[2.1.0] = 010), 7053 = 3 (Bit[2.1.0] = 011)

Read Digital Input/Output Data Format

Data of $AA6,$AA4,$AALS: (First Data)(Second Data)00

Data of @AA: (First Data)(Second Data)

	First Data		Second Data	
I-7041/41D	DI(8-13)	00 to 3F	DI(0-7)	00 to FF
I-7042/42D	DO(8-12)	00 to 1F	DO(0-7)	00 to FF
I-7043/43D	DO(8-15)	00 to FF	DO(0-7)	00 to FF
I-7044/44D	DO(1-8)	00 to FF	DI(1-4)	00 to 0F
I-7050/50D	DO(0-7)	00 to FF	DI(0-6)	00 to 7F
I-7052/52D	DI(0-7)	00 to FF	00	00
I-7053/53D	DI(8-15)	00 to FF	DI(0-7)	00 to FF
I-7060/60D	DO(1-4)	00 to 0F	DI(1-4)	00 to 0F
I-7063s *1	DO(1-3)	00 to 07	DI(1-8)	00 to FF
I-7065s *2	DO(1-5)	00 to 1F	DI(1-4)	00 to 0F
I-7066/66D	DO(1-7)	00 to 7F	00	00
I-7067/67D	DO(1-7)	00 to 7F	00	00

*1 I-7063s include : I-7063/63D/63A/63AD/63B/63BD
*2 I-7065s include : I-7065/65D/65A/65AD/65B/65BD

2. Commands

Command Format: **(Leading)(Address)(Command)[CHK](cr)**

Response Format: **(Leading)(Address)(Data)[CHK](cr)**

[CHK] 2-character checksum

(cr) end-of-Command character, character return(0x0D)

Calculate Checksum:

1. Calculate ASCII sum of all characters of command (or response) string except the carriage return (cr).

2. Mask the sum of string with 0ffh.

Example:

Command string: $012(cr)

Sum of string = '$'+'0'+'1'+'2' = 24h+30h+31h+32h = B7h

The checksum is B7h, and [CHK] = "B7"

Command string with checksum: $012B7(cr)

Response string: !01400600(cr)

Sum of string: '!'+'0'+'1'+'4'+'0'+'0'+'6'+'0'+'0'

= 21h+30h+31h+34h+30h+30h+36h+30h+30h = 1ACh

The checksum is ACh, and [CHK] = "AC"

Response string with checksum: !01400600AC(cr)

General Command Sets			
Command	**Response**	**Description**	**Section**
%AANNTTCCFF	!AA	Set Module Configuration	***Sec.2.1***
#**	No Response	Synchronized Sampling	***Sec.2.2***
#AABBDD	>	Digital Ouput	***Sec.2.3***
#AAN	!AA(Data)	Read Digital Input Counter	***Sec.2.4***
$AA2	!AATTCCFF	Read Configuration	***Sec.2.5***
$AA4	!S(Data)	Read Synchronized Data	***Sec.2.6***
$AA5	!AAS	Read Reset Status	***Sec.2.7***
$AA6	!(Data)	Read Digital I/O Status	***Sec.2.8***
$AAF	!AA(Data)	Read Firmware Version	***Sec.2.9***
$AAM	!AA(Data)	Read Module Name	***Sec.2.10***
$AAC	!AA	Clear Latched Digital Input	***Sec.2.11***
$AACN	!AA	Clear Ditial Input Count	***Sec.2.12***
$AALS	!(Data)	Read Latched Digital Input	***Sec.2.13***
@AA	>(Data)	Read Digital Input	***Sec.2.14***
@AA(Data)	>	Set Digital Output	***Sec.2.15***
~AAO(Data)	!AA	Set Module Name	***Sec.2.16***

Host Watchdog Command Sets			
Command	**Response**	**Description**	**Section**
~**	No Response	Host OK	***Sec.2.17***
~AA0	!AASS	Read Module Status	***Sec.2.18***
~AA1	!AA	Reset Module Status	***Sec.2.19***
~AA2	!AAVV	Read Host Watchdog Timeout Value	***Sec.2.20***
~AA3EVV	!AA	Set Host Watchdog Timeout Value	***Sec.2.21***
~AA4V	!AA(Data)	Read PowerOn/Safe Value	***Sec.2.22***
~AA5V	!AA	Set PowerOn/Safe Value	***Sec.2.23***

2.1 %AANNTTCCFF

Description: Set module Configuration

Syntax: %AANNTTCCFF[CHK](cr)

%	Delimiter character
AA	Address of setting module (00 to FF)
NN	New Address for setting module (00 to FF)
TT	Type 40 for DIO module
CC	New baud rate for setting module (Ref. *Sec. 1.9*). Short INIT* to ground when changing baud rate. (Ref *Sec. 3.1*)
FF	New data format for setting module (Ref. *Sec. 1.9*). Short the INIT* to ground to change checksum setting. (Ref. *Sec. 3.1*)

Response: Valid Command: **!AA[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module(00 to FF)

Example:

Command: %0102400600 Receive: !02

Set module Address 01 to 02; return successful.

Related Command:

Sec. 2.5 $AA2

Related Topics:

Sec. 1.9 Configuration Tables, *Sec. 3.1* INIT* pin Operation

2.2 #**

Description: Synchronized Sampling

Syntax: #[CHK](cr)**

Delimiter character

** Synchronized sampling Command

Response: No response

Example:

Command: #** No response

Send synchronized sampling Command to all modules.

Command: $014 Receive: !10F0000

Read synchronized data from Address 01, return S=1, first read and data.

Command: $014 Receive: !00F0000

Read synchronized data from Address 02, return S=0, have read data.

Related Command:

Sec. 2.6 $AA4

2.3 #AABBDD

Description: Digital Output

Command: #AABBDD[CHK](cr)

Delimiter character

AA Address of reading module(00 to FF)

BBDD Output command and parameter

For multichannel outputs, set BB = 00, 0A, or 0B. It selects the output group. DD is the output value.

Parameter for Multi-Channel Output					
	Output Channels	DD for command #AABBDD			
		BB=00/0A		BB=0B	
I-7042/42D	13	00 to FF	DO(0-7)	00 to 1F	DO(8-12)
I-7043/43D	16	00 to FF	DO(0-7)	00 to FF	DO(8-15)
I-7044/44D	8	00 to FF	DO(1-8)	NA	NA
I-7050/50D	8	00 to FF	DO(0-7)	NA	NA
I-7060/60D	4	00 to 0F	RL(1-4)	NA	NA
I-7063s *1	3	00 to 07	RL(1-3)	NA	NA
I-7065s *2	5	00 to 1F	RL(1-5)	NA	NA
I-7066/66D	7	00 to 7F	RL(1-7)	NA	NA
I-7067/67D	7	00 to 7F	RL(1-7)	NA	NA
*1 I-7063s include : I-7063/63D/63A/63AD/63B/63BD *2 I-7065s include : I-7065/65D/65A/65AD/65B/65BD					

To output a single-channel, set BB = 1c, Ac, or Bc where c is the selected channel. Set DD to 00 to clear output and 01 to set the output.

Parameter for Single-Channel Output				
	Single channel output command #AABBDD			
	c for BB=1c/Ac		c for BB=Bc	
I-7042/42D	0 to 7	DO(0-7)	0 to 4	DO(8-12)
I-7043/43D	0 to 7	DO(0-7)	0 to 7	DO(8-15)
I-7044/44D	0 to 7	DO(1-8)	NA	NA
I-7050/50D	0 to 7	DO(0-7)	NA	NA
I-7060/60D	0 to 3	RL(1-4)	NA	NA
I-7063s *1	0 to 2	RL(1-3)	NA	NA
I-7065s *2	0 to 4	RL(1-5)	NA	NA
I-7066/66D	0 to 6	RL(1-7)	NA	NA
I-7067/67D	0 to 6	RL(1-7)	NA	NA
*1 I-7063s include : I-7063/63D/63A/63AD/63B/63BD *2 I-7065s include : I-7065/65D/65A/65AD/65B/65BD				

Response: Valid Command: **>[CHK](cr)**

Invalid Command: **?[CHK](cr)**

Ignored Command: **![CHK](cr)**

Syntax or communication error may get no response.

> Delimiter for valid Command

? Delimiter for invalid Command

! Delimiter for ignoring the Command. The module's host watchdog timeout status is set, and the output is set to Safe Value.

Example:

Command: #0100FF Receive: >

Assume module is CB-7044, set Address 01 output value FF; return is successful.

Command: #021001 Receive: >

Assume module is CB-7067, set Address 02 channel 0 on, return is successful.

Command: #021701 Receive: ?

Set Address 02 channel 7 on, return the channel is invalid for CB-7067; it only has seven outputs (0 to 6).

Command: #0300FF Receive: !

Set Address 03 output value FF, return ignore. The module's host watchdog timeout status is set, and the output is set to Safe Value.

Related Command:

Sec. 2.15 @AA(Data), *Sec. 2.18* ~AA0, *Sec. 2.19* ~AA1

Related Topics:

Sec. 1.9 Configuration Tables, *Sec. 3.2* Module Status, *Sec. 3.3* Dual Watchdog Operation

Note:

The Command is not for CB-7041/41D/52/52D/53/53D.

2.4 #AAN

Description: Read Digital Input Counter from channel N

Command: #AAN[CHK](cr)

#	Delimiter character
AA	Address of reading module (00 to FF)
N	channel to read

Response: Valid Command: **!AA(Data)[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module(00 to FF)
(Data)	Digital input counter value in decimal, from 00000 to 65535

Example:

Command: #032 Receive: !0300103

Read Address 03 digital input counter value of channel 2, return value 103.

Command: #025 Receive: ?02

Read Address 02 digital input counter value of channel 5, return the channel is not available.

Related Command:

Sec. 2.12 $AACN

Note:

The Command is not for CB-7042/42D/43/43D/66/66D/67/67D.

2.5 $AA2

Description: Read Configuration

Command: $AA2[CHK](cr)

$ Delimiter character

AA Address of reading module (00 to FF)

2 Command for read configuration

Response: Valid Command:

!AATTCCFF[CHK](cr)

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

! Delimiter for valid Command

? Delimiter for invalid Command

AA Address of response module(00 to FF)

TT Type code of module; it must be 40

CC Baud rate code of module (Ref. *Sec. 1.9*)

FF Data format of module (Ref. *Sec. 1.9*)

Example:

Command: $012 Receive: !01400600

Read Address 01 status, return DIO mode, baud 9600, no checksum.

Related Command:

Sec. 2.1, %AANNTTCCFF

Related Topics:

Sec. 1.9, Configuration Tables; *Sec. 3.1,* INIT* pin Operation

2.6 $AA4

Description: Read Synchronized Data

Command: $AA4[CHK](cr)

$	Delimiter character
AA	Address of reading module (00 to FF)
4	Command for read synchronized data

Response: Valid Command: **!S(Data)[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module(00 to FF)
S	Status of synchronized data, 1 = first read, 0 = been read
(Data)	synchronized DIO value (Ref. *Sec. 1.9*)

Example:

Command: $014 Receive: ?01

Read Address 01 synchronized data, return no data available.

Command: #** Receive: no response

Send synchronized sampling to all modules.

Command: $014 Receive: !1000F00

Read Address 01 synchronized data, return S=1, first read, and synchronized data 0F00

Related Command:

*Sec. 2.2, #***

Related Topics:

Sec. 1.9, Configuration Tables

2.7 $AA5

Description: Read Reset Status

Command: $AA5[CHK](cr)

$	Delimiter character
AA	Address of reading module (00 to FF)
5	Command for read reset status

Response: Valid Command: **!AAS[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module(00 to FF)
S	Reset status, 1 = the module has been reset, 0 = the module has not been reset.

Example:

Command: $015 Receive: !011

Read Address 01 reset status, return first read.

Command: $015 Receive: !010

Read Address 01 reset status, return no reset occurred.

Related Topics:

Sec3.4, Reset Status

2.8 $AA6

Description: Read Digital I/O Status

Command: $AA6[CHK](cr)

$	Delimiter character
AA	Address of reading module (00 to FF)
6	Command for read digital input/output status

Response: Valid Command: **!(Data)[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module(00 to FF)
(Data)	Digital input/output value (Ref. *Sec. 1.9*)

Example:

Command: $016 Receive: !0F0000

Assume module is CB-7060. Read Address 01 DIO status, return 0F00; digital input IN1 to IN4 are open, digital output RL1 to RL4 are off.

Related Command:

Sec. 2.14, @AA

Related Topics:

Sec. 1.9, Configuration Tables

2.9 $AAF

Description: Read Firmware Version

Command: $AAF[CHK](cr)

$	Delimiter character
AA	Address of reading module (00 to FF)
F	Command for read firmware version

Response: Valid Command: **!AA(Data)[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module(00 to FF)
(Data)	Firmware version of module

Example:

Command: $01F Receive: !01A2.0

Read Address 01 firmware version, return version A2.0.

Command: $02F Receive: !01B1.1

Read Address 01 firmware version, return version B1.1.

2.10 $AAM

Description: Read Module Name

Command: $AAM[CHK](cr)

$	Delimiter character
AA	Address of reading module (00 to FF)
M	Command for read module name

Response: Valid Command: **!AA(Data)[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module(00 to FF)
(Data)	Name of module

Example:

Command: $01M Receive: !017042

Read Address 01 module name, return name 7042.

Command: $03M Receive: !037060D

Read Address 03 module name, return name 7060D.

Related Command:

Sec. 2.16, ~AAO(Data)

2.11 $AAC

Description: Clear Latched Digital Input

Command: $AAC[CHK](cr)

$	Delimiter character
AA	Address of setting module (00 to FF)
C	Command for clear latched digital input

Response: Valid Command: **!AA[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module(00 to FF)

Example:

Command: $01L0 Receive: !01FFFF00

Read Address 01 latch-low data, return FFFF.

Command: $01C Receive: !01

Clear Address 01 latched data, return successful.

Command: $01L0 Receive: !01000000

Read Address 01 latch-low data, return 0000.

Related Command:

Sec. 2.13, $AALS

Note:

The Command is not for CB-7042/42D/43/43D/66/66D/67/67D.

2.12 $AACN

Description: Clear Digital Input Counter

Command: $AACN[CHK](cr)

$	Delimiter character
AA	Address of setting module (00 to FF)
C	Command for clear digital input counter
N	Digital counter channel N to clear

Response: Valid Command: **!AA[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module(00 to FF)

Example:

Command: #010 Receive: !0100123

Read Address 01 input channel 0 counter value, return 123.

Command: $01C0 Receive: !01

Clear Address 01 input channel 0 counter value, return successful.

Command: #010 Receive: !0100000

Read Address 01 input channel 0 counter value, return 0.

Related Command:

Sec. 2.4, #AAN

Note:

The Command is not for CB-7042/42D/43/43D/66/66D/67/67D.

2.13 $AALS

Description: Read Latched Digital Input

Command: $AALS[CHK](cr)

$	Delimiter character
AA	Address of reading module (00 to FF)
L	Command for reading latched digital input
S	1 = select latched high status, 0 = select latched low

Response: Valid Command: **!(Data)[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module(00 to FF)
(Data)	read status (Ref. *Sec. 1.9*) 1= the input channel is latched, 0=the input channel is not latched.

Example:

Command: $01L1 Receive: !012300

Read Address 01 latch-high data, return 0123.

Command: $01C Receive: !01

Clear Address 01 latched data, return successful.

Command: $01L1 Receive: !000000

Read Address 01 latch-high data, return 0.

Related Command:

Sec. 2.11, $AAC

Note:

The Command is not for CB-7042/42D/43/43D/66/66D/67/67D.

2.14 @AA

Description: Read Digital Input/Output Status

Command: @AA[CHK](cr)

@ Delimiter character

AA Address of reading module (00 to FF)

Response: Valid Command: **>(Data)[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

> Delimiter for valid Command

? Delimiter for invalid Command

AA Address of response module(00 to FF)

(Data) Read DIO status (Ref. *Sec. 1.9*)

Example:

Command: @01 Receive: >0F00

Read Address 01 DIO status, return 0F00.

Related Command:

Sec. 2.8, $AA6

Related Topics:

Sec. 1.9, Configuration Tables

2.15 @AA(Data)

Description: Set Digital Output

Command: @AA(Data)[CHK](cr)

@ Delimiter character

AA Address of setting module (00 to FF)

(Data) output value, the data format is following:

(Data) is one character for output channel less than 4

For CB-7060/60D, from 0 to F

For CB-7063/63D/63A/63AD/63B/63BD, from 0 to 7

(Data) is two characters for output channel less than 8

For CB-7044/44D/50/50D, from 00 to FF

For CB-7065/65D/65A/65AD/65B/65BD, from 00 to 1F

For CB-7066/66D/67/67D, from 00 to 7F

(Data) is four characters for output channel less than 16

For CB-7042/42D, from 0000 to 1FFF

For CB-7043/43D, from 0000 to FFFF

Response: Valid Command: **>[CHK](cr)**

Invalid Command: **?[CHK](cr)**

Ignore Command: **![CHK](cr)**

Syntax or communication error may get no response.

> Delimiter for valid Command.

? Delimiter for invalid Command.

! Delimiter for ignore Command. The module is in Host Watchdog Timeout Mode, and the output is set to SafeValue.

Example:

Command: @017 Receive: >

Output Address 02 value 7, return successful.(The example is suitable for CB-7060/60D/63/63D/63A/63AD/63B/63BD)

Command: @0200 Receive: >

Output Address 01 value 00, return successful.(The example is suitable for CB-7044/44D/50/50D/65/65D/65A/65AD/65B/65BD/66/66D/67/67D)

Command: @030012 Receive: !

Output Address 03 value 0012, return the module is in host watchdog timeout mode, the output Command is ignored. (The example is suitable for CB-7042/42D/43/43D)

Related Command:

Sec. 2.3, #AABBDD; *Sec. 2.18,* ~AA0; *Sec. 2.19,* ~AA1

Relate;d Topics:

Sec. 1.9, Configuration Tables; *Set.3.2,* Module Status; *Sec. 3.3* Dual Watchdog Operation; *Sec. 3.5,* Digital Output

Note:

The Command is not for CB-7041/41D/52/52D/53/53D.

2.16 ~AAO(Data)

Description: Set Module Name

Command: ~AAO(Data)[CHK](cr)

~	Delimiter character
AA	Address of setting module (00 to FF)
O	Command for set module name
(Data)	New name for module, max 6 characters

Response: Valid Command: **!AA[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module(00 to FF)

Example:

Command: ~01O7050 Receive: !01

Set Address 01 module name 7050, return successful.

Command: $01M Receive: !017050

Read Address 01 module name, return name 7050.

Related Command:

Sec. 2.10, $AAM

2.17 ~**

Description: Host OK.

Host send this Command to all modules for send the information “Host OK”.

Command: ~[CHK](cr)**

~ Delimiter character

** Command for all modules

Response: No response.

Example:

Command: ~** No response

Related Command:

Sec. 2.18, ~AA0; *Sec. 2.19,* ~AA1; *Sec. 2.20,* ~AA2; *Sec. 2.21,* ~AA3EVV; *Sec. 2.22,* ~AA4V; *Sec. 2.23,* ~AA5V

Related Topic:

Sec. 3.2, Module Status; *Sec. 3.3,* Dual Watchdog Operation

2.18 ~AA0

Description: Read Module Status

Command: ~AA0[CHK](cr)

~ Delimiter character

AA Address of reading module (00 to FF)

0 Command for read module status

Response: Valid Command: **!AASS[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

! Delimiter for valid Command

? Delimiter for invalid Command

AA Address of response module(00 to FF)

SS Module status, 00=host watchdog timeout status is clear, 04=host watchdog timeout status is set. The status will store into EEPROM and only may reset by the Command ~AA1.

Example:

Refer to *Sec. 2.21,* ~AA3EVV example.

Related Command:

Sec. 2.17, ~**; *Sec. 2.19,* ~AA1; *Sec. 2.20,* ~AA2; *Sec. 2.21,* ~AA3EVV; *Sec. 2.22,* ~AA4V; *Sec. 2.23,* ~AA5V

Related Topic:

Sec. 3.2, Module Status; *Sec. 3.3,* Dual Watchdog Operation

2.19 ~AA1

Description: Reset Module Status

Command: ~AA1[CHK](cr)

~	Delimiter character
AA	Address of setting module (00 to FF)
1	Command for reset module status

Response: Valid Command: **!AA[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module (00 to FF)

Example:

Refer to *Sec. 2.21,* ~AA3EVV example.

Related Command:

Sec. 2.17, ~**; *Sec. 2.18,* ~AA0; *Sec. 2.20,* ~AA2; *Sec. 2.21,* ~AA3EVV; *Sec. 2.22,* ~AA4V; *Sec. 2.23,* ~AA5V

Related Topic:

Sec. 3.2, Module Status; *Sec. 3.3,* Dual Watchdog Operation

2.20 ~AA2

Description: Read Host Watchdog Timeout Value

Command: ~AA2[CHK](cr)

~	Delimiter character
AA	Address of reading module (00 to FF)
2	Command for read host watchdog timeout value

Response: Valid Command: **!AAEVV[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module(00 to FF)
E	Host watchdog enable status, 1 = Enable, 0 = Disable
VV	Timeout value in HEX format, each count is 0.1 second, 01h = 0.1 second and FFh = 25.5 seconds

Example:

Refer to *Sec. 2.21,* ~AA3EVV example.

Related Command:

Sec. 2.17, ~**; *Sec. 2.18,* ~AA0; *Sec. 2.19,* ~AA1; *Sec. 2.21,* ~AA3EVV; *Sec. 2.22,* ~AA4V; *Sec. 2.23,* ~AA5V

Related Topic:

Sec. 3.2, Module Status; *Sec. 3.3,* Dual Watchdog Operation

2.21 ~AA3EVV

Description: Set Host Watchdog Timeout Value

Command: ~AA3EVV[CHK](cr)

~	Delimiter character
AA	Address of setting module (00 to FF)
3	Command for set host watchdog timeout value
E	1 = Enable, 0 = Disable host watchdog
VV	Timeout value, from 01 to FF, each for 0.1 second

Response: Valid Command: **!AA[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module (00 to FF)

Example:

Command: ~010 Receive: !0100

Read Address 01 module status, return host watchdog timeout status is clear.

Command: ~013164 Receive: !01

Set Address 01 host watchdog timeout value 10.0 seconds and enable host watchdog, return successful.

Command: ~012 Receive: !01164

Read Address 01 host watchdog timeout value; return that host watchdog is enabled, and time interval is 10.0 seconds.

Command: ~** No response

Reset the host watchdog timer.

Wait for about 10 seconds and don't send command ~**, the LED of module will flash. The flashing LED indicates the host watchdog timeout status is set.

Command: ~010 Receive: !0104

Read Address 01 modul status, return host watchdog timeout status is set.

Command: ~012 Receive: !01064

Read Address 01 host watchdog timeout value, return that host watchdog is disabled, and time interval is 10.0 seconds.

Command: ~011 Receive: !01

Reset Address 01 host watchdog timeout status, return successful. And the LED of this module stop flash.

Command: ~010 Receive: !0100

Read Address 01 module status, return host watchdog timeout status is clear.

Related Command:

Sec. 2.17, ~**; *Sec. 2.18,* ~AA0; *Sec. 2.19,* ~AA1; *Sec. 2.20,* AA2; *Sec. 2.22,* ~AA4V; *Sec. 2.23,* ~AA5V

Related Topic:

Sec. 3.2, Module Status; *Sec. 3.3,* Dual Watchdog Operation

2.22 ~AA4V

Description: Read PowerOn/Safe Value.

Command: ~AA4V[CHK](cr)

~	Delimiter character
AA	Address of reading module (00 to FF)
4	Command for read PowerOn/Safe Value
V	P = read PowerOn value, S = read Safe Value

Response: Valid Command: **!AA(Data)[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module(00 to FF)
(Data)	PowerOn Value or Safe Value

For CB-7042/42D/43/43D (Data) is VVVV, where VVVV is the PowerOn Value (or Safe Value).

For other modules, (Data) is VV00, where VV is the PowerOn Value(or Safe Value).

Example:

Command: @010000 Receive: >

Output Address 01 value 0000, return successful.

Command: ~015S Receive: !01

Set Address 01 Safe Value, return successful.

Command: @01FFFF Receive: >

Output Address 01 value FFFF, return successful.

Command: ~015P Receive: !01

Set Address 01 PowerOn Value, return successful.

Command: ~014S Receive: !010000

Read Address 01 Safe Value, return 0000.

Command: ~014P Receive: !01FFFF

Read Address 01 PowerOn Value, return FFFF.

Related Command:

Sec. 2.17, ~**; *Sec. 2.18,* ~AA0; *Sec. 2.19,* ~AA1; *Sec. 2.20,* ~AA2; *Sec. 2.21,* ~AA3EVV; *Sec. 2.23,* ~AA5V

Related Topic:

Sec. 3.2, Module Status; *Sec. 3.3,* Dual Watchdog Operation

Note:

The Command is not for CB-7041/41D/52/52D/53/53D.

2.23 ~AA5V

Description: Set PowerOn/Safe Value.

Command: ~AA5V[CHK](cr)

~	Delimiter character
AA	Address of setting module (00 to FF)
5	Command for set PowerOn/Safe Value
V	P = set current output as PowerOn Value, S = set current output as Safe Value

Response: Valid Command: **!AA[CHK](cr)**

Invalid Command: **?AA[CHK](cr)**

Syntax or communication error may get no response.

!	Delimiter for valid Command
?	Delimiter for invalid Command
AA	Address of response module(00 to FF)

Example:

Command: @01AA Receive: >

Output Address 01 value AA, return successful.

Command: ~015P Receive: !01

Set Address 01 PowerOn Value, return successful.

Command: @0155 Receive: >

Output Address 01 value 55, return successful.

Command: ~015S Receive: !01

Set Address 01 Safe Value, return successful.

Command: ~014P Receive: !01AA00

Read Address 01 PowerOn Value, return PowerOn Value AA.

Command: ~014S Receive: !015500

Read Address 01 Safe Value, return Safe Value 55.

Related Command:

Sec. 2.17, ~**; *Sec. 2.18*, ~AA0; *Sec. 2.19*, ~AA1; *Sec. 2.20*, ~AA2; *Sec. 2.21*, ~AA3EVV; *Sec. 2.22*, ~AA4V

Related Topic:

Sec. 3.2, Module Status; *Sec. 3.3*, Dual Watchdog Operation

Note:

The Command is not for CB-7041/41D/52/52D/53/53D.

3. Application Notes

3.1 INIT* pin Operation

Each CB-7000 module has a build-in EEPROM to store configuration information such as address, type, baud rate and other information. Sometimes, a user may forget the configuration of the module. Therefore, the CB-7000 have a special mode named "**INIT mode**", to help user to resolve the problem. The "**INIT mode**" is setting as **Address=00, baud rate=9600bps, no checksum**

To enable INIT mode, please follow these steps:

Step 1. Power-down the module.

Step 2. Connect the INIT* pin to the GND pin.

Step 3. Power-up the module.

Step 4. Send Command $002(cr) in 9600 bps to read the configuration stored in the module's EEPROM.
Refer to "**7000 Bus Converter User Manual**" *Sec. 5.1* and "**Getting Started**" for more information.

3.2 Module Status

PowerOn Reset or **Module Watchdog Reset** will set all outputs to the **PowerOn Value**. The module can accept the host's Command to change the output value.

Host Watchdog Timeout will set all output to the **Safe Value**.The module's status (read by Command ~AA0) will be 04, and the output Command will be ignored.

3.3 Dual Watchdog Operation

Dual Watchdog = Module Watchdog + Host Watchdog

The Module Watchdog is a hardware reset circuit that monitors the module's operating status. When working in harsh or noisy environment, the module may go down by a noise signal. The Module Watchdog times out and sets output to PowerOn value.

The Host Watchdog is a software function to monitor the host's operating status. Its purpose is to detect a network communication problem or a halted host. When the timeout interval expired, the module will put all outputs to the predefined Safe Value. This places the controlled element in a known-safe condition.

The CB-7000 module with Dual Watchdog makes the control system more reliable and stable.

3.4 Reset Status

The Reset Status is set while the module power on or reset by Module Watchdog, and is cleared when the Command read Reset Status ($AA5) is applied. This is useful for user to check the module's working status. When the Reset Status is set means the module is reset and the output may be changed to the PowerOn Value. When the Reset Status is clear means the module is not reset, and the output cannot be changed.

3.5 Digital Output

A module's output can have one of three values:

1. **Safe Value**. If the host watchdog timeout status is set, the output is set to Safe Value.If the module receives an output

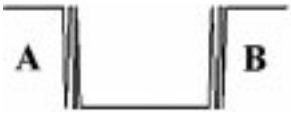
Command, such as @AA(Data) or #AABBDD, the module ignores the command and returns '!', and will not change the output to the output command value. **The host watchdog timeout status is set and stored in EEPROM when the host watchdog timeout interval expired, and only can be cleared by Command ~AA1.** If user wants to change the output, he first needs to clear the host watchdog timeout status, then send an output command to change the output to a desired value.

2. **PowerOn Value**. When the Module Watchdog Timer is set, and the host watchdog timeout status is clear, the module's output is set to the predefined PowerOn Value.

3. **Output Command value**. If the host watchdog timeout status is clear, the user issues a digital output command such as @AA(Data) or #AABBDD to the module for changing the output value. The module will respond successful (receive >).

3.6 Latched Digital Inputs

If, for example, the user connects a PB switch to a a digital I/O module input channel and wants to read the switch stoke. The input is a pulse digial input, and user will lose the data. When read



by Command $AA6 in A or B position, the response is that no input occurred and he will lose the pulse information. However, the read latch-low digital input Command $AAL0 will solve this problem. When $AAL0 Command in A and B position is issued, the response indicates that there was a low pulse between A and B position for a switch closure.

4 DN Module

4.1 DN-SSR4

Output Channel: Four Solid State Relay Contacts

Output Specification:

Type: Zero-Cross AC Solid-State Relay Output

Rated Load Voltage: 200 to 240 VAC

Rated Load Current: 4 Amps

Surge Current: 50 A,

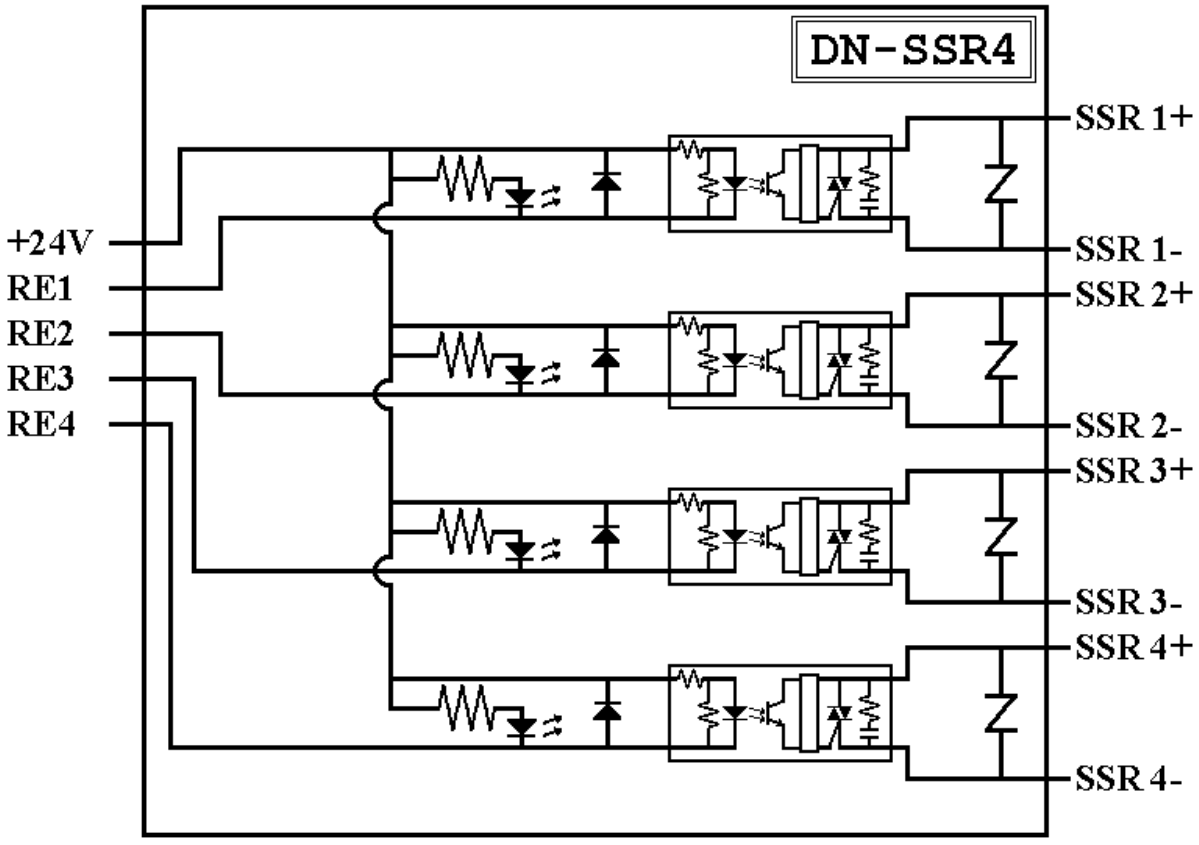
Max. Off-State Leakage Current: 5.0 mA

Operate Time: 1/2 cycle of voltage sine wave + 1ms

Input Impedance: 1.5K Ohms

DIN-Rail mounted

Power Input: +24VDC



4.2 DN-PR4

Output Channel: Four Mechanical Relay Contacts

Output Specification:

Type: 1 form-C Relay Contact

Nominal Load: 5A@250VAC, 5A@30VDC

Max. Switching Power: 1250VAC

Max. Switching Voltage: 250VAC, 150VDC

Max. Switching Current: 5 A.

Mechanical/Electrical Life: Min. $10x10^6/10x10^4$ operations.

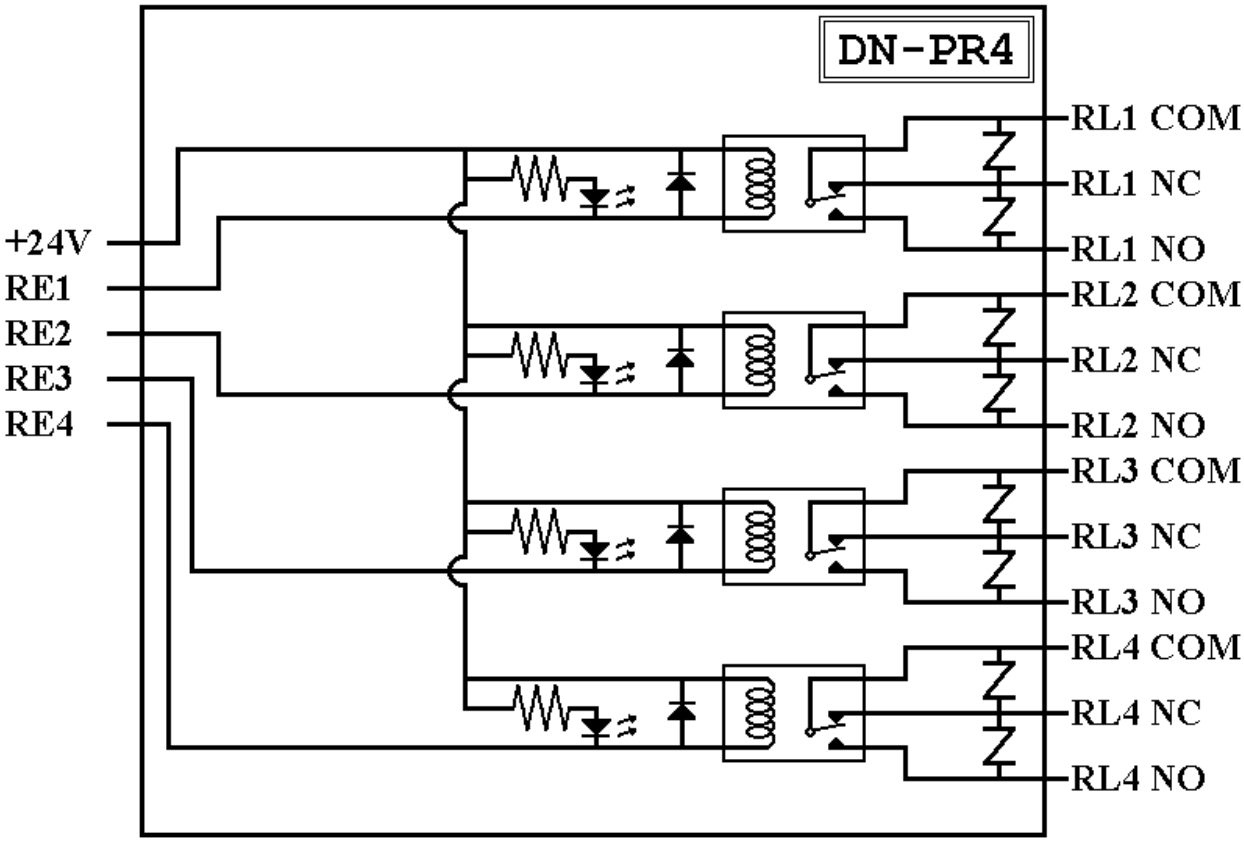
Operate/Release Time: Max. 10 ms/5 ms

Dielectric Strength: 2000VAC 1 minute

Nominal Coil Power: 360 mW

DIN-Rail mounted

Power Input: 24VDC



4.3 RM-104, RM-108, RM-116

Output Channel: 4/8/16 Relay Contacts

Output Specification:

Type: 1 Form-C Relay Contact

Rated Load: 16 A.@250VAC

Max. Switching Voltage: 400VAC

Max. Peak Current: 30 A.

Standard Contact Material: AgCd0

Min. Life: 100,000 operations.

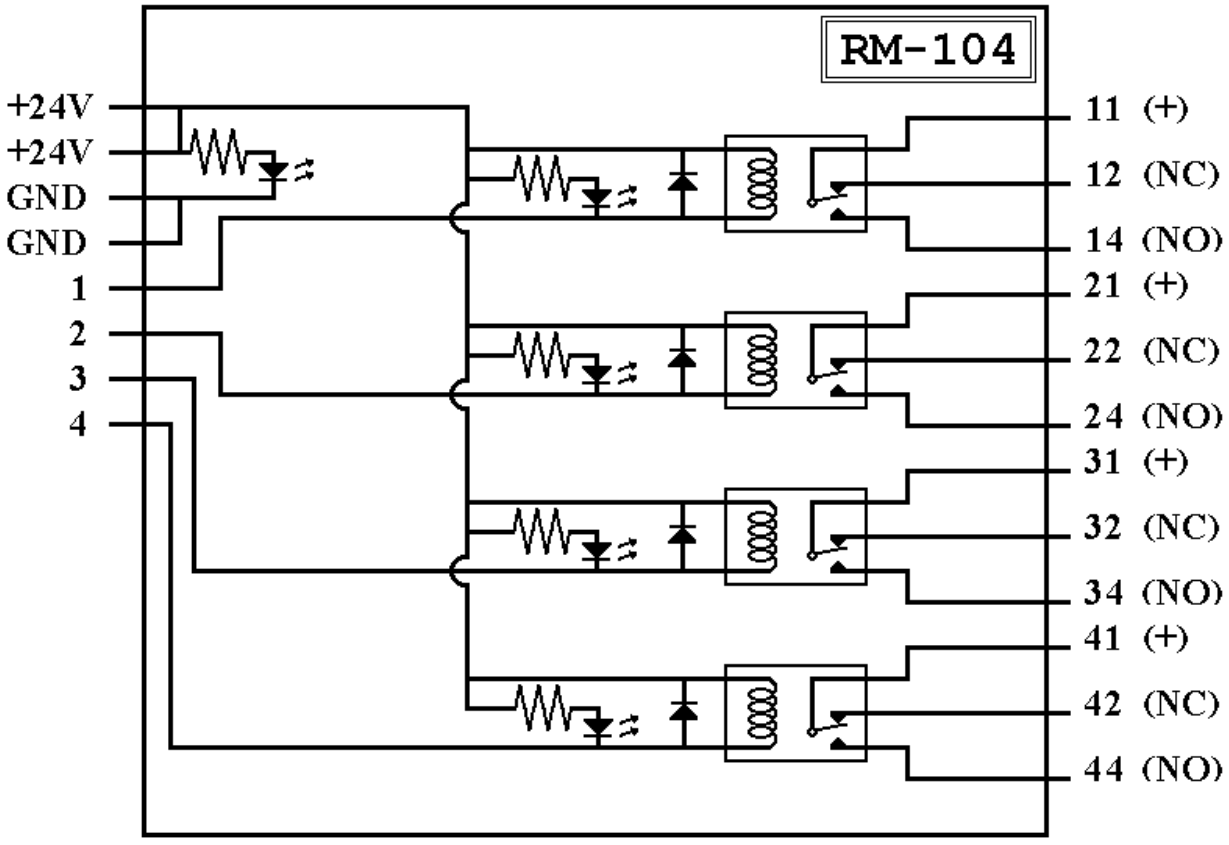
Din-Rail mounted

Dimension:

RM-104: 78 x 77mm RM-108: 135 x 77mm

RM-116: 270 x 77mm

Power Input: 24VDC



4.4 RM-204, RM-208, RM-216

Output Channel: 4/8/16 Relay Contacts

Relay Specification:

Type: 2 Form-C

Rated Load: 5 A.@250VAC

Max. Switching Voltage: 400VAC

Max. Peak Current: 10 A.

Standard Contact Material: Ag Nt

Min. Life: 100,000 operations.

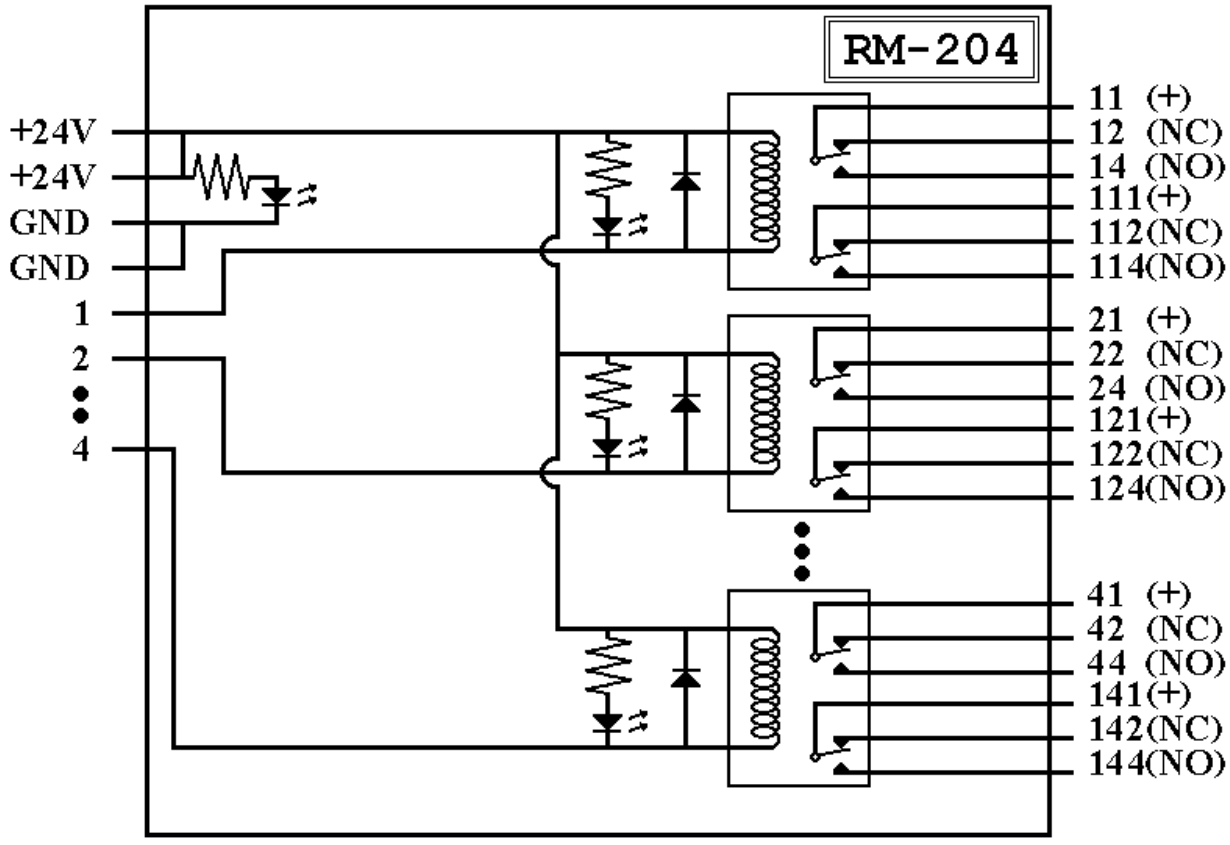
Din-Rail mounted

Dimension:

RM-204: 78 x 77mm RM-208: 135 x 77mm

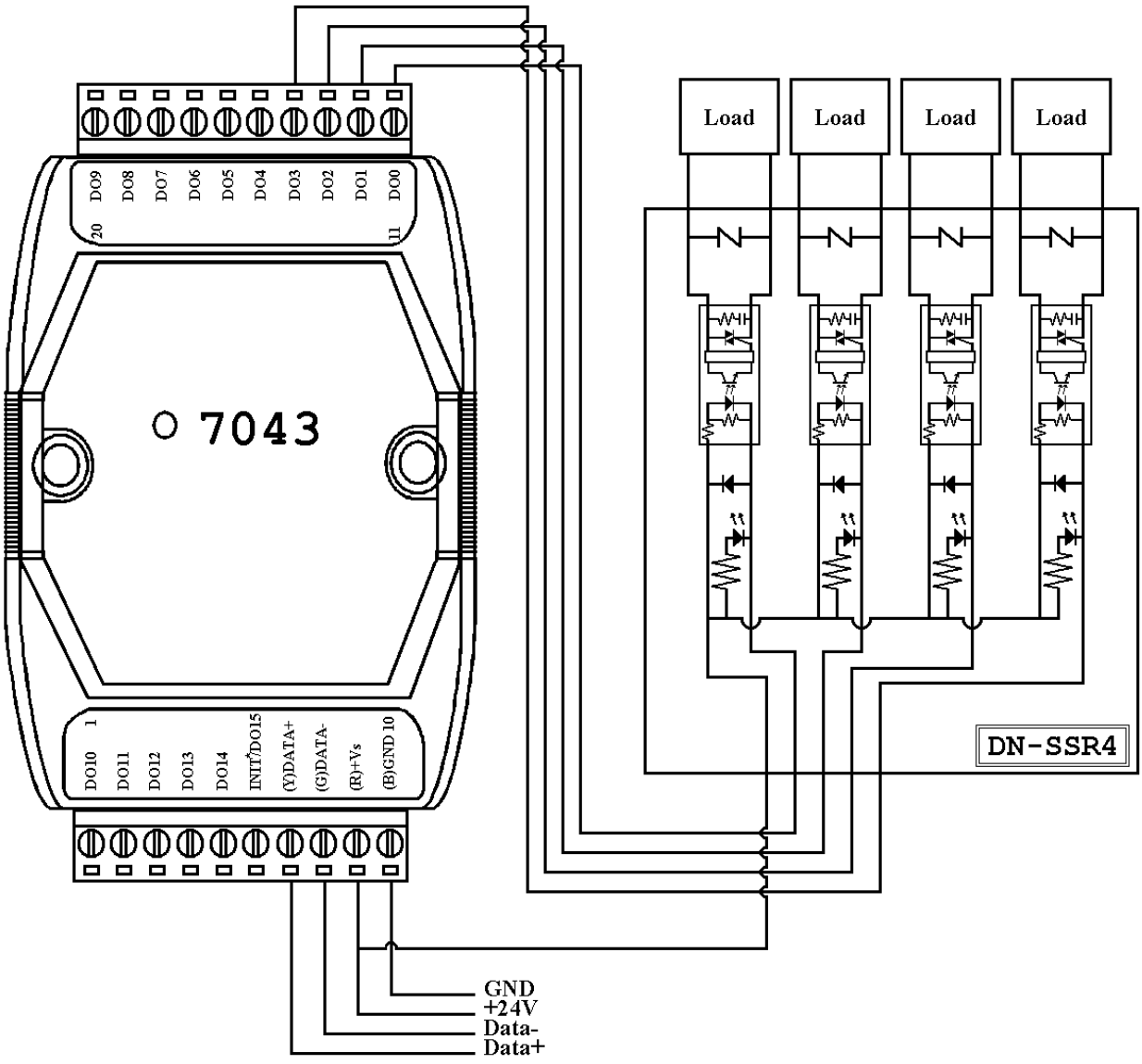
RM-216: 270 x 77mm

Power Input: 24VDC



4.5 Application

The DN Modules are the IO extension of CB-7000 modules. These modules can drive more power and heavy loads . User may use CB-7000 modules, like CB-7043 or others, to control the DN modules to drive loads.



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EC Declaration of Conformity

We, Measurement Computing Corp., declare under sole responsibility that the product:

Part Number	Description
CB-7041/42/43/44/50/52/53/60/63/65/66/67	Digital I/O Modules

to which this declaration relates, meets the essential requirements, is in conformity with, and CE marking has been applied according to the relevant EC Directives listed below using the relevant section of the following EC standards and other normative documents:

EU EMC Directive 89/336/EEC: Essential requirements relating to electromagnetic compatibility.

EU 55022 Class B: Limits and methods of measurements of radio interference characteristics of information technology equipment.

EN 50082-1: EC generic immunity requirements.

IEC 801-2: Electrostatic discharge requirements for industrial process measurement and control equipment.

IEC 801-3: Radiated electromagnetic field requirements for industrial process measurements and control equipment.

IEC 801-4: Electrically fast transients for industrial process measurement and control equipment.

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